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SUBCOMMITTEE MEETING

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August 24, 2005

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P A R T I C I P A N T S

(By Group, in Alphabetical Order)

BOARD MEMBERS

CHAIR
ZIEMER, Paul L., Ph.D.
Professor Emeritus
School of Health Sciences
Purdue University
Lafayette, Indiana

EXECUTIVE SECRETARY
WADE, Lewis, Ph.D.
Senior Science Advisor
National Institute for Occupational Safety and Health
Centers for Disease Control and Prevention
Washington, DC

MEMBERSHIP

ESPINOSA, Richard Lee
Sheet Metal Workers Union Local #49
Johnson Controls
Los Alamos National Laboratory
Espanola, New Mexico

GIBSON, Michael H.
President
Paper, Allied-Industrial, Chemical, and Energy Union
Local 5-4200
Miamisburg, Ohio

GRIFFON, Mark A.
President
Creative Pollution Solutions, Inc.
Salem, New Hampshire

MUNN, Wanda I.
Senior Nuclear Engineer (Retired)
Richland, Washington

PRESLEY, Robert W.
Special Projects Engineer
BWXT Y12 National Security Complex
Clinton, Tennessee

ROESSLER, Genevieve S., Ph.D.
Professor Emeritus
University of Florida
Elysian, Minnesota

STAFF/VENDORS

LASHAWN SHIELDS, Committee Management Specialist, NIOSH
STEVEN RAY GREEN, Certified Merit Court Reporter

AUDIENCE PARTICIPANTS

BEHLING, HANS, SC&A
BERRY, CHARLENE, MALLINCKRODT
BLOSSER, FRED, NIOSH
BROCK, DENISE, UNWW/MALLINCKRODT
CASE, DIANE L., DEPT. OF LABOR
DOWNS, DEB, TITAN
DUGAN, PAUL, MALLINCKRODT
ELLISON, CHRIS, NIOSH OCAS
FITZGERALD, JOSEPH, SC&A
HINNEFELD, STUART, NIOSH
HOMOKI-TITUS, LIZ, HHS
HOWELL, EMILY, HHS
KOENIG, PHYLLIS, MCW
LEISAR, KEN, ST. LOUIS POST-DISPATCH
MAKHIJANI, ARJUN, SC&A
MAURO, JOHN, SC&A
MCKEEL, DAN & LOUISE, VILLAGE IMAGE NEWS
NUGENT, MARY, GAO
OLSEN, DOROTHY, MALLINCKRODT
PRESLEY, LOUISE S., WIFE OF ROBERT PRESLEY
RAMSPOTT, JOHN
ROSENTHAL, JAMES, MALLINCKRODT
SAMPSON, BOB, GAO
SCHWENNESEN, CLARENCE, UNWW
SCHAEFFER, D. MICHAEL, SAIC
TENFORDE, THOMAS, NCRP
TOOHEY, RICHARD, ORAU
WILDHABER, SANDRA, MALLINCKRODT
ZIEMER, MARILYN

P R O C E E D I N G S

(10:06 a.m.)

WELCOME AND OPENING COMMENTS

DR. ZIEMER: I'm going to call the meeting to order. Thank you very much. Just for the record, this is a meeting of the subcommittee on dose reconstruction and dose -- site profile reviews. The full Board will not be meeting until tomorrow. I will make some of the usual announcements and that is to remind everyone to register your attendance. This includes board members, staff people, members of the public. There are registration materials or registration book in the foyer where you can take care of that. There are also other handout materials and copies of the agenda and related materials for all members of the public as well as others who are here today.

Also members of the public, there is a sign-up sheet if you wish to speak during the public comment session. The first public comment session will be tomorrow evening at 7:00 p.m. as part of the regular Board meeting.

On our subcommittee agenda today we have four main items. We have not assigned any times to them. The subcommittee will simply work

through the various issues until we believe we've reached closure and then we'll move on. You'll notice the four main items are the Bethlehem Steel site profile, the selection of the fourth round of 20 dose reconstructions, the Mallinckrodt site profile review, and discussion of candidate site profile reviews for our contractor. We also may want to have some discussion on the status and how to move forward on procedures review, which is task three, I believe.

Because of the possibility that we may need additional information from NIOSH as we select dose reconstruction review cases, it was suggested that we take that item up first, the selection of the fourth round of 20 dose reconstructions. So without objection, we will begin with that and then we will move to the Bethlehem site profile after that. And I'm going to -- yes, Lew Wade has a number of comments for us as we get underway today.

DR. WADE: Thank you, Paul. I'd just first like to start by apolo-- not apologizing, but thanking everyone for coming here. We had a working group meeting not that long ago and

during that meeting a number of the Board members present made the strong suggestion that we spend a day in subcommittee because we really had many weighty items to work on -- Wanda, Jim Melius, Mark -- and I always do what Wanda tells me to do, so I thought this would be a good idea to have this meeting. But I do apologize that we've sprung it on you relatively late, but I think it is terribly important.

A couple of -- Paul alluded to the procedures review. There'll be a couple of things I think we'll get into today as they will flow from agenda items on the subcommittee and the full Board agenda and I'd like to just give you a heads-up on them.

The procedures review is something that has been sitting for a while. There is an issue there that relates to dose conversion factors. It turns out that that is a very important issue relative to our deliberations on Mallinckrodt, so I asked the contractor to be prepared to talk to us about those things. Again, we have to schedule it to see that we made progress where we need to, and if that

means we need to get into some other areas, we'll be -- I'll feel free to do that.
Also as we look at SC&A's work for next year, particularly on site profiles, I think we need to hear where they are on some of the open site profiles -- Savannah River, for example -- and again I asked the contractor to come prepared to give us some insights on those issues. So I think we will have a full day's meeting and again I thank you for your time and attendance.
DR. ZIEMER: Thank you, Lew. One other item, Board members. As you use the mike, I've been told that the mikes work best if they're about 10 inches away from the mouth. So actually that's -- is that right? This is a nine-inch span here. Do I want to be this far away?
THE REPORTER: Yes. Otherwise I'm getting real -- a buzz.
DR. ZIEMER: Don't get so close is what Ray is saying. Okay, thank you.
DR. WADE: Oh, one other thing. Larry Elliott is not with us today and I don't know if Larry will be with us. Just for the record, he's having some health problems, back problem. And so we are ably represented in our offices by

Stu Hinnefeld and Jim Neton. So if we need guidance or input from the program we will turn to those gentlemen.

SELECTION OF 4TH ROUND OF 20 DOSE RECONSTRUCTIONS

DR. ZIEMER: Thank you very much. In your booklet today -- I think it's -- it's the second tab after the agenda. It's called 20 dose reconstruction is what the tab says. You will find a table which Stu Hinnefeld I believe has developed for us and -- is Stu in the assembly?

DR. WADE: Yes, sir.

DR. ZIEMER: Stu, could you take a minute and just describe for the subcommittee what you have included here for us as we get underway on the selection of cases.

MR. HINNEFELD: Yeah, I believe they're probably --

DR. WADE: It's not on.

(Pause)

MR. HINNEFELD: I believe there are probably four spreadsheets or four tables in this tab entirely, and -- is this -- I haven't seen your compilation. Is this the first one that you have? Is it a normal sized sheet of paper?

DR. ZIEMER: Actually that's -- that's the last one, I think, that extra long one.

MR. HINNEFELD: For the selection of cases this time, since has been an expressed preference for what you might consider a best-estimate dose reconstruction -- recall that we, for efficiency purposes, will do intentional overestimate for cases that aren't going to be compensable even with an overestimated exposure, and an intentional underestimate for cases that won't be compensable even with an underestimating expo-- or will be compensable with an underestimating exposure. But there's been a preference to focus the review on what you might call a best-estimate dose reconstruction.

And so in our database of cases that we have in-house, there is a data field that describes the type of dose reconstruction that was done and it's -- we use the term "full dose reconstruction" as opposed to a best estimate, and that field -- that field is selected by the health physicist -- the OCAS health physicist who approves the dose reconstruction report. So for an approved dose reconstruction report

we will have a judgment by that health physicist whether this was a best estimate or full dose reconstruction or not.

So based on that I selected for the Board's consideration -- I took two possible approaches here because I didn't know what you would want to do. In one case we ran the random selection program, which we normally do, of cases that are in the sampling pool. These are cases where the final decision has been rendered. And so the one list where it has schedule -- or selection ID numbers 2005-08- starting with -001 and running through 100, those were randomly selected in the manner that we have previously randomly selected cases for selection.

We've added one additional data column that wasn't in our previous presentations, and that's that last column that says dose estimation type. And so from that dose estimation type you can see whether the case was an overestimate, an underestimate or a full dose reconstruction. You'll notice some of those columns are blank, and that's because this feature of selecting what kind of dose

reconstruction is in front of us was not incorporated at the beginning of the program. It was added after we had already approved a number of dose reconstructions and so that field is blank for the early approved dose reconstructions.

So that's one possibility, is for selection as normal from the randomly selected cases here, with the additional piece of information of what type of dose reconstruction it was.

Now the majority of the cases that we have done have been overestimates or underestimates, and so based on that, there probably won't be many full dose reconstructions on this list. I haven't actually counted how many there are, but I doubt there are very many.

So we have about 160 cases that have final decisions that have one of the three full dose reconstruction categories selected. That can be just full dose reconstruction, mainly internal; full dose reconstruction, mainly external; and full dose reconstruction, internal and external -- internal and external talking about the kind of dose that is associated with the case.

So we collected all the cases, the 168 -- 160 some-odd cases, I don't know how many it is exactly -- that have one of those three full dose reconstruction choices and prepared those on the other table that looks very similar, but the selection IDs start with 101 and then run on out through the completion. That's the entire population in the sampling pool, meaning that there is a final decision rendered, of cases that were done that have that intern-- you know, full dose reconstruction done. So those two populations are presented for selection, however you want to proceed.

The last question -- yes. Okay. The last sheet, the large sheet, is a statistical breakdown of the selections to date compared to that same statistic of the population as -- in total. Now this is actually of the total claim population. Not just the ones that have final decisions, but the total claim population that we have received that ultimately we will expect to have a dose reconstruction on.

So the first upper left -- or the left side of that page apportions cases according to the site where -- you know, where the person

worked, the Energy employee worked, and you can see how many of the 60 reviewed cases are from these various sites. And you can see the total down at the bottom of 66. That's because several of these were multiple site cases and so, not knowing what to do, I counted them in both sites. If a person worked in two sites, I counted them in both sites. If one person worked at three sites, the three Oak Ridge sites, so he's counted in all three. And the multi-site cases are explained down below. I think that total adds up to six because -- well, I'm pretty sure it adds up to six extras and that's why we get 66.

The cancer type section, which is the next section moving to the right, is -- oh, I'm sorry, I wanted to say how we arrived at the projected cases. The projected cases per site took the total number of cases from that site that we have received that have not been pulled. And the reason I subtracted the pulled cases is that theoretically there will never be a dose reconstruction for a pulled case. Pulled case means that Labor has told don't do this one -- usually it's don't do this, we sent

it to you by mistake, and so we pull it, but it's -- you know, it's still in our database, but we have a designation of "pulled" in the status category. So for most cases that are pulled, there will never be a dose reconstruction.

Now some cases get unpulled and, you know, there's some consideration -- reconsideration and it's submitted back to us. Yeah, go ahead and do the dose reconstruction, so some cases do get unpulled. But as a -- the best approximation I could come up with was we'll just subtract out the pulled cases. So if you take the total cases we've received from the site minus the pulled cases from that site, that's how many dose reconstructions we would ultimately expect to have from that site based on the data available on the day I ran this, which was one day last week. So I took that number of cases times 2 1/2 percent and that gives that projected case number. 'Cause I believe two and a half percent -- I retained that original intent to review 2 1/2 percent of the cases, which was what we started with, I believe. So that's how those projected case

numbers were arrived at.
The sample of industry groups is a little different, and the problem is that because of the multi-site experience -- you know, many of the cases have multiple -- worked at multiple sites. Many of the Energy employees worked at multiple sites. And so when you add up all the cases from -- that are represented in these sites, and you -- or, you know, adding up all the -- when you add up all the cases from all these sites, you're adding some numbers twice. And so if you added up all the columns of total cases from these sites you'd get probably more than the total cases we have in-house. So to arrive at the sample of industry groups number, the projected number, I had our TST query our database to find out how many cases do we have that don't have any representation in these listed sites. You know, none of these pe-- how many people never worked any of these sites, and that was about 15 percent. About 15 percent of the cases we have didn't work at any -- they have no employment at any of these sites. And so, based on the ratio of, you know, 15 over 8, 5 times the original selection

number, which was something around a little less than 500, I added in some 80 cases for others. It's all other sites besides the ones that are listed.

Okay. I think that's all I can think of to say on that. I've probably made it as confusing as I possibly can so it's time to move on to the next one.

DR. WADE: Could we just clarify -- not a clarifying question, but just to note something you're telling the subcommittee. So your sense is that for the subcommittee to -- for the Board to meet its original goal of 2 1/2 percent of the cases audited, it would involve roughly 550 cases.

MR. HINNEFELD: Roughly. Roughly. Now the arithmetic gets a little --

DR. WADE: I understand.

MR. HINNEFELD: -- funky.

DR. WADE: Okay, so we're -- so doing 60 a year, we've got 10 years worth of work. Okay.

MR. HINNEFELD: That thought hadn't even occurred to me, Lew. I'm starting to look at retirement at that time.

DR. WADE: Well, I mean I'm just putting it on

the record because I think the Board needs to consider these things as it sort of learns the reality of what it set out to do. And I'm not saying we go one way of the other. I think it's just -- it's something to note.

MR. HINNEFELD: Okay. Moving to the right on the page, the next section has the -- refers to types of cancers, and this really requires some more -- better analysis than what I got onto this spreadsheet, as I was thinking about this when I was looking at the numbers. And the problem here is that -- counting total number of cancer diagnoses, which is how I arrived at this -- if you count the total number of cancer diagnoses, you will get far more than the total number of claims because there are many cases with multiple cancers. And as you look at this number and you see that some 40 percent of the cases are skin cancer, that's because skin cancer is a case where very, very frequently there are multiple cancers. Multiple skin cancers in particular occurs. And so the count number doesn't reflect necessarily that if a person had a basal cell carcinoma, they may have had 10 basal cell carcinomas. It still

counts as one because that's the way it was presented in the selection sheet. So there needs to be a better analysis here. I need to not count the total number of cancer diagnoses. I need to actually do a count case-by-case, how many cancers are represented in that one and only count a basal cell carcinoma once per case. So this is -- other than see what cases -- what now the -- the count number, the column on the count, that is pretty accurate in terms of the kinds of cancers that were present in the cases that were reviewed. The count is, I believe, accurate in terms of what cancer -- types of cancers have been reviewed.

Moving to the next segment of the spreadsheet which has -- is job group, in this case I have a revised projected number. I retained the originally projected number from the spreadsheet as it originally appeared. The revised projected number is based on some 2 1/2 percent of total cases, and I'm having trouble reconciling all my numbers here, so I'll have to do a little research to figure out exactly why this is 499. I suspect it has to do with not adding in sampling groups or a different

starting point from the 2 1/2 percent. The apportionment of the cases into these groups is done by matching the job title that we have on our database, in NOCTS, with the -- into one of these groups. And since there's a lot of question marks about how to do that, I think there should also be a spreadsheet in your book that shows the 60 cases with the job descriptions and the group that I chose to put that -- that I thought fit best with that job description. So that can be changed, whatever, 'cause I'm not saying that what I did necessarily was right. For instance, I put all machinists in maintenance, even though at some facilities machinists are in operations because they're machining uranium ingots. I'm not real sure what support -- you know, what category -- I put support -- people in support if I couldn't figure out where else to put them, so there's some transportation people and security people and things like that in the support group. So -- but I believe there should be a spreadsheet in the book that describes the selection based on the job titles, so those could be changed and rearranged if you would

like.

DR. WADE: That spreadsheet requires some assembly in that it's in two pieces, but --

MR. HINNEFELD: Oh, okay.

DR. WADE: -- the information's all in the book.

MR. HINNEFELD: Okay. And then the next column, decade first employed, that broke sort of inconveniently so that the count falls onto the next page. That just shows the distribution. The projected was retained from the original spreadsheet that was prepared of the projected numbers that would go in those categories, and I just threw in the count -- the numbers -- the actual numbers that we have so far. And then when you get into the years worked category, the same thing. I just threw in the count of the cases actually reviewed. And then I went below and broke out some more five-year intervals because when you group to 10 years and then 10 years and over, almost everybody's in 10 years and over. And so I broke it down further -- a little further into additional five year increments up to 30 years. This is on page two of that big sheet.

The next column, type of radiation and the count, I didn't fill that in because I wasn't sure I knew how to do that. And then the remainder is -- well, the next column is outcome on how many were compensable and how many were noncompensable. Those count numbers are, I believe, accurate -- 11 of the 60 reviewed were compensable and 49 were non. And then the rest is sort of some of the total numbers that I used to arrive at the numbers per site and the projected number per site. And I've listed the numbers for the three gaseous diffusion plants individually that are summed back in the original spreadsheet. So these are the statistics on the sixty that have been selected so far in terms of -- and I guess it's useful in terms of knowing how many have been selected from what site, how many -- from what cancers have been selected, et cetera.

DR. ZIEMER: Thank you, Stu. Let me ask, subcommittee members, you have any questions for Stu at this point? Is everything clear?

DR. WADE: John Mauro might want to say something 'cause --

DR. ZIEMER: John Mauro, did you have any

comments at this point or do you want to wait until later?

DR. MAURO: I'll wait until later.

DR. ZIEMER: Okay. Now just as a reminder, we had our original 20 cases, then we had a group of -- actually of 18 because two of them were removed because they turned out not to be final or were moved back into the process. And then we had another actually 22 to get us up to the 60. And -- and so -- and you have the breakdown of the 60. Now the question is -- selection of the next 20 is the immediate question. We have a list of 100 selected at random. This gives us a good pool to choose from, and we have the list of 100 which are in the special category where they were not the maximized or minimized ones.

DR. WADE: We have all of them. Not a hundred, but all of them.

DR. ZIEMER: Basically all of them, yeah, not just a hundred. There are actually what, 100 and whatever it is, 80 or something.

DR. WADE: 184 it looks like.

DR. ZIEMER: Yeah, 184. Now we need to think in terms -- there's a couple of issues that we

have to address. One is how to proceed. Do you want to look at a mix of -- you know, a priori say okay, we want to select a certain number of the ones from list two, which is all completed cases with full dose estimation -- and let me ask Stu, in that list as you presented them there, are those randomized in any way or are those in the order that they were in your database?

MR. HINNEFELD: I suspect they're in NIOSH tracking order number, although I won't swear to that. I believe they were in NIOSH tracking -- and then we took that NIOSH tracking number out before we made it available for distribution. So that's what I think the order is.

MR. GRIFFON: But are these -- Stu, are these all the cases that have done -- were done by best estimate?

MR. HINNEFELD: Yes, these are all the cases where the reviewing HP clicked that -- one of those full dose reconstruction buttons. It's all of them.

DR. WADE: But you wouldn't encounter them in random order. You're encountering them in some

order, not randomly.

MR. HINNEFELD: I believe you will be encountering them in NIOSH tracking order number, I think. I don't know 100 percent, but I think they're in NIOSH tracking order number, in which case they'll be roughly chronological.

DR. ZIEMER: Yeah, and the only reason for raising that is it could conceivably introduce some kind of bias, although I'm not sure that it matters that much at this point since we would be selecting very specifically for a certain parameter. So it loses its randomness in any event.

But let me throw the question out to the subcommittee. Do you wish to specify, a priori, some number of full dose estimation cases out of the next 20? For example, do you want 10 of them to be in that category or all of them or five of them or -- because one way to proceed would be to use the random list but to reserve a spot for some number on the other list. Any thoughts on that?

DR. WADE: If I could insert myself. I mean John, you -- you approached this group and told them of the way you would like to see this go.

Could you just recall for us what your views are on this?

DR. MAURO: You folks have received a handout. Hans -- Kathy Behling basically tried to come up with a sort of what we've done to date to give you a snapshot of -- according to the criteria -- selection criteria where we are in terms of audits of cases. And you can get a pretty good feel of the degree to which we've captured different categories of cases. What is not on that list, of course, is -- as you all know, we've been looking at primarily, overwhelmingly, min/max selections and we felt that the value -- the value to the Board of doing min/max audits is not -- it's not as valuable as doing realistic -- for a variety of reasons. It doesn't fully test the full sophistication of the new TIBs, the new workbooks, the spreadsheets that would allow for more realistic analysis. So it was our recommendation at the last meeting that an effort be made to include certain realistic cases. So -- and we believe that the process of auditing will be better served, and that would move us into a new mode of looking at

workbooks, which are -- we believe are going to largely be the tools that will be used to implement the realistic analyses. So we think we're about to enter into a new paradigm -- to overuse use a term -- that will allow us to provide a much more powerful insight into the effectiveness and -- of an audit that would be a lot more complete.

One more thought, though, that struck us -- and this is something that struck me and I'd like to share with the Board and that is we recently have been through quite an intensive -- in this series of investigations related to Mallinckrodt site profile whereby an array of strategies and procedures and assumptions were constructed over the past month, which was quite an adventure and challenge -- a technical challenge. I think we have gotten to the point where we -- we, SC&A, have an appreciation of a new way of coming at a very complex problem.

One of the things that might be helpful -- and this is something that was not brought up before -- is when we are in a mode where there is a transition occurring in how dose reconstructions are being performed, the extent

to which -- to get to the bottom of the story, we would sure like to review some Mallinckrodt realistic cases that are being dose reconstructed right now and are being completed using the new methods so that we could -- you know, we did go through some examples and that was an excellent exercise. But even those examples, as we recall during the working group meeting, didn't fully test a number of issues that are still on the table, issues that I call somewhat marginal, but still need to be worked out. I would very much like to see -- and I don't know how well it fits within the construct of case selection, but there certainly are certain cases that will demonstrate how the TBD and the procedures are coming together into a final form. Because as we all know, they are living documents, but it appears that some of them are approaching asymptotically the methodology. And those case -- cases that represent that methodology need to be reviewed, and that almost closes the circle because right now we really have not -- I know Mallinckrodt's going to be on the agenda, but it's not unrelated to what are

talking about today. But doing several realistic Mallinckrodt audits within the context of the new Mallinckrodt TBD and how it may even change a little bit further before this is all over is going to really help bring closure to the entire process we're talking about. So I'd like to add that as one more item on the table for discussion. Thank you.

DR. ZIEMER: Hans, you have something to add to that?

DR. BEHLING: I guess on Monday -- closing day Monday -- Kathy had forward by e-mail to each of you a set of documents here that by and large defined the criteria -- selection criteria as already discussed by Stu Hinnefeld. But one of the criteria I wanted to point out is the issue of the POC category. And according to the selection criteria, between 45 and 49.9 percent POC we were supposed to have about 40 percent of our sample selected in that particular category -- which is the critical category because if you make a mistake in one direction or the other, it would certainly determine whether or not a person should have been compensated that wasn't, or the other way

around. And if you look at the very last page of that handout, there's a fourth page there which has the breakdown of what the first 60 cases represent. You will see that as of this point in time among the 60 cases that have been reviewed -- or are under review 'cause we're not completely finished at this point -- 82 percent fall between zero and 44.9 percent and 18, the balance, is greater than 50. So right now we have none of the cases that fall between 45 and 49.9. And supposedly the selection criteria would dictate that 40 percent of the cases reviewed should fall into that critical area. So if you haven't had a chance to look at it, this -- these several pages that Kathy sent to you by e-mail identify at this point some of the things that Stu has already mentioned. That is, which facilities have been looked at and what types of cancers, et cetera. But the critical one is the issue of selecting the POC as a criteria, and the critical criteria is the one between 45 and 49.9 percent, which we have not yet seen. And supposedly 40 percent of the cases we've audited should fall into that category.

DR. ZIEMER: Thank you. John, additional -- oh, a question here first from Dr. Roessler.
DR. ROESSLER: Most of my stuff is on my computer. What was the name of that attached file? I'm trying to find it.
DR. BEHLING: I am not sure.
DR. ROESSLER: I know I got it, but I can't --
DR. BEHLING: I know some of you must have it.
MR. GRIFFON: It's called case selection -- case selection. It's a PowerPoint presenta-- it's a PowerPoint file.
You should be able to find it by that.
DR. ROESSLER: Case selection.
DR. ZIEMER: John, did you have an additional comment?
DR. MAURO: Yes. To make a complicated situation a little bit more complicated, as we discussed at the last meeting, the fact that we may actually have a case that falls between 45 and 49, if it turns out it was a maximizing case that fell at 45 to 49, it still doesn't satisfy what we'd like to accomplish. So we'd like to see 45 to 49 -- realistic cases.
DR. ZIEMER: Yes, thank you. Just one other question, maybe SC&A can help us on this.

Basically the first 20 cases we're essentially done with. We have had a couple of outstanding items, I think -- or did we close those off last time, I don't recall. But second -- the next 18 we still have to do the roll-up on. Where are we on the third 22 cases? The reason I'm asking this now is, for example, if we're talking about doing these cases and there's a reliance on the workbooks, and there's a need for a workbook review process, we need to think about sequentially how we do this. You know, are we ready to do this next 20 without having done the workbook review which is being proposed, I believe, really for next year's work. So -- but John, you can answer that after Hans gives his other comment or --

DR. BEHLING: Yeah, I just wanted to mention where we are on the third set of 22 cases. We are at this point very close to finishing. We do expect to finalize the review process by the end of September and have obviously the draft report in your hands for comments and review. So we're at this point finishing up all of the 22 cases which, as I said, will be presented to you in a draft report.

DR. ZIEMER: Right, and then we'll have to go through the iteration of reviewing --
DR. BEHLING: Yes.
DR. ZIEMER: -- comments and resolving issues.
DR. BEHLING: Yes.
DR. ZIEMER: Right. Thank you. John?
DR. MAURO: Whenever case or a TBD is put upon us to work on, next fiscal year, the workbooks are part and parcel of that. In other words, the idea -- the concept that there's a boundary between the two doesn't exist. If in fact we're reviewing a case that -- whereby a workbook was used in order to implement that case and the workbook, by its very nature, implements the provisions of a TBD, well, that workbook, as far as we're concerned, is just one more procedure that is part of the whole that has to be reviewed in the audit process. So I think that we have achieved something important in that we are integrating it into the process, and we will -- those will be reviewed.
Now there are also generic workbooks, and here's a separate -- here's where I think things get a little bit more complicated. So

from the point of view of site-specific workbooks -- let's say they deal with Savannah River -- we get a case to review it and that case, when it was performed a workbook was used, we have every reason to expect that we will receive that workbook along with the case and we will audit that case using the workbook. And not only that, audit the workbook against the procedures. So it's -- so that the whole story is told and that will be delivered to you.

However, there are workbooks that are generic, that cut across all sites. That right now is problematic, in that -- logistically -- in that they may not -- if we're in the process of doing task four audits and if the site -- if the case references that workbook as one of the tools that were used, yes, it will be brought into the audit process. But if it doesn't, it won't be reviewed until it's reviewed as part of task three.

DR. ZIEMER: Uh-huh.

DR. MAURO: But maybe that's okay, as long as it's not, you know, needed to do task four, we're fine. One of the problems that could

exist is that it may have been used, a generic workbook or even a site-specific workbook may have been used, but may not be cited in the dose reconstruction report. That's one of our concerns. That is, it's important that the dose reconstruction report fully cite everything that it drew upon so that we could track it.

DR. ZIEMER: Yeah. Basically I'm asking if SC&A is comfortable in moving ahead on reviewing the cases -- the full dose cases without having completed the task of workbook review. And it sounds like you're saying yes --

DR. MAURO: Absolutely --

DR. ZIEMER: -- we can proceed.

DR. MAURO: Absolutely yes. Absolutely yes. In fact, we see it as the preferred method to have the workbook review very much -- the site-specific workbook reviews very much part of the audits.

DR. ZIEMER: Okay, thank you. That's helpful.

DR. WADE: I need to make one more comment.

DR. ZIEMER: Lew.

DR. WADE: Just -- just before we start to --

the subcommittee starts to deliberate, Stu or Jim, is there anything NIOSH would like to say to inform this discussion and decision, or have you said everything that needs to be said?

MR. HINNEFELD: I don't know that I have anything else to say. The suggestion that you review Mallinckrodt cases might be a little problematic because I thought the Board reviewed final decision cases. And if we're talking about cases that will be done with the latest up-to-date revisions of the site profile, those won't be final for some period of time. That's the only thing that occurred to me during the discussion.

DR. WADE: Thank you. I just wanted to make sure we had the record full.

DR. ZIEMER: Right. That would be a departure from the policy of the Board to do that. Okay, other comments? Yes, John, you have an additional...

DR. MAURO: Hans just pointed something out to me that I think needs to be -- an appreciation. When we do an audit, Hans -- Hans' expectation is that the audit may very well bring in a particular aspect of a workbook, a particular

exposure pathway where the workbook was used. It may not necessarily bring in the full array of tools that are in the workbook.

DR. ZIEMER: Right.

DR. MAURO: So we'll what we're going to have is an interesting situation. We will review -- we will audit the case, and in so doing we will audit those portions of the workbook that supports the case. But it would not be a complete audit review of the entire workbook if the workbook has a very broad scope.

DR. ZIEMER: Right.

DR. MAURO: But that workbook -- let's say it pertains to a particular site -- will receive complete review as part of our site profile review if it's a site-specific. So there's going to be a little bit of synergy between the two. And in addition, if there's a generic workbook out there that is not reviewed as part of either a site profile review or a case, it will be reviewed as part of task three. So I think we're covered.

DR. ZIEMER: Yeah, so the procedures review would pick it up otherwise, yes.

DR. MAURO: Yes, so I think we've got this

problem in a box.

DR. ZIEMER: Yeah, I think -- that's helpful. Thank you.

Okay, Board members, have you had a chance to think about how to proceed on this next 20 cases in terms of, first of all, the mix of random versus full dose estimation cases? Who wants to speak to that? Mark, you have a --

MR. GRIFFON: Yeah. I mean I think we need to heavily weight it toward the best estimate cases. I did want to point out that when you sort this -- I guess a couple of things. Lew raised the total number of cases, so our projected numbers in our first column, you know, might not be correct if we don't think we're going to do 10 years worth of cases. So there's a couple of variables there, but if you look at these cases, there's about -- I think there's about 180 of them and 67 are Savannah River. And that -- now it may not be totally a bad thing because I think -- just thinking -- and I agree with the Mallinckrodt concept in general. I think that we have to wait until Mallinckrodt -- until those cases are fully adjudicated. But with that in mind, I think

maybe we want to do some parallel processing with the site profile reviews that are underway, so we'd have Savannah River, Y-12 and Hanford -- I think we've received reports for all three of those, maybe Nevada test site, from SC&A, so it may be good to get some best estimate cases that rely also on that site profile so we're kind of doing -- doing a dual track on that. So -- but I did want to point out that 70 cases out of those 180 are Savannah River, so this a -- and this is all of the best estimate cases. So I went through and I think I came up with like 10 to 15 that I'd even be interested in out of that whole list, so maybe we can get close to 15 and then do some of the -- five of the random ones.

DR. ZIEMER: So you're suggesting 15 cases out of the full dose estimate table and five others from the random table. How do others feel about that as a... Wanda?

MS. MUNN: That seems reasonable enough to me. I would think that since we've been asked specifically about the 44-49 percent cases, that perhaps we might pick four or five that fulfill that requirement at the outset,

somewhat without regard to -- without focus, I should say, on precisely where they're from. And since so many of the full dose estimates really and truly are Savannah River, obviously a number of those are going to fall in that category. But I would think providing say five such cases would be a good place to start before we move on to the suggestion that Mark's made.

MR. GRIFFON: Do you know how many fall above 45? I haven't sorted that way.

MS. MUNN: No.

MR. GRIFFON: I would just be concerned that if they were all lung cancers from Savannah River, I'm not sure -- you know.

MS. MUNN: No.

DR. ZIEMER: Let's take a quick look at that. I think we can identify them. Case 110 is colon, Savannah River, 48 percent. There is a 44 percent one. It's not at 45, but it's close. Okay, here's a 45, lung at Savannah River, case 145.

MR. GRIFFON: I can answer the question. There's three cases that fall from 45 to 50.

DR. ZIEMER: Yeah, there's another Savannah

River, male genitalia, case 155. Are those the only three?

MR. GRIFFON: That's it, those three.

MS. MUNN: And they're all Savannah River

MR. GRIFFON: There's some that are really close, 44.96, 44.86, 44.74.

DR. ZIEMER: There's a 44.7 -- call it 45 -- at Savannah River. It's case 216.

DR. ROESSLER: There's a 44.74 that's Hanford.

DR. ZIEMER: Oh, that's Hanford. I looked at the wrong line. Yes, that's the Hanford thyroid. So there are a few of those.

MR. GRIFFON: So we can probably shoot for four or five in that region, even if it's 44 percent, and I think -- yeah.

DR. ZIEMER: There's a 44.86 -- which basically is 45 -- Savannah River, bone, which is case 163.

DR. ROESSLER: Wouldn't you round up to 45?

DR. ZIEMER: I would. I don't think we know these to two decimal points, in any event, even though NIOSH likes to show us that. But that's the way it comes out on the computer. You want to start with those and see if you want to include them? Why don't we do that? Is that

agreeable as a starting point?
Let me ask about case 110, the colon case from Savannah River, do you wish to include that?
DR. ROESSLER: Yes.
MR. GRIFFON: Yes.
DR. ZIEMER: Any objections? Now this will be a recommendation to the full Board tomorrow, so that's one.
There is a 44.4, malignant melanoma, case 113, at Savannah River. Do you want to include that?
DR. ROESSLER: Should round that one down, if we're going to stick to the --
DR. ZIEMER: Well, it's 44, but I mean...
MS. MUNN: Yeah, it seems reasonable.
MR. GRIFFON: I would vote for two other ones before that one --
DR. ZIEMER: Okay.
MR. GRIFFON: -- 105 and 216.
DR. ZIEMER: 105, which is 45. -- really 44.6 percent, which is a liver. Yeah, that's a little better.
MR. GRIFFON: Savannah River.
DR. ZIEMER: Anyone object to 105?
MS. MUNN: No.

DR. ZIEMER: Okay.
MR. GRIFFON: And 216 is the one that Gen just mentioned, the thyroid at Hanford.
MS. MUNN: Uh-huh.
DR. ZIEMER: 216, the thyroid at Hanford.
MS. MUNN: That's good.
DR. ZIEMER: What about 163, the bone at Savannah River? Okay on that one?
MS. MUNN: Yeah, and 155? Oh, is that what we just did?
DR. ROESSLER: 163 we just did.
MS. MUNN: Oh, we said 163. What about 155? Again, it's still Savannah River, but it's...
MR. GRIFFON: Yeah.
DR. ZIEMER: Which one?
MS. MUNN: 155.
DR. ZIEMER: 155, male genitalia and bone at Savannah River.
MR. GRIFFON: I would kind of vote -- I don't know. We've got three Savannah Rivers in that region.
MS. MUNN: Yeah, we do.
DR. ZIEMER: Yeah. Well, there's one --
MR. GRIFFON: I just assumed we're holding that slot for now.

DR. ZIEMER: The 155 may be a little better than 163. They're both the same cancer, they're both Savannah River. The 155 is 47 percent.

MS. MUNN: Uh-huh.

MR. GRIFFON: Well, one's bone and all male genitalia, that (unintelligible).

DR. ZIEMER: Yeah, they're both bone and all male genitalia.

MR. GRIFFON: Oh, they are? Oh, yeah, okay. That's fine with me to switch those.

MS. MUNN: I'd say so.

DR. ZIEMER: Use 155. Okay, so we have 105, 110, 155, and 216 so far out of this list.

MS. MUNN: Uh-huh.

DR. ZIEMER: Now that's only four cases. If we want some other full dose cases, in the absence of additional cases between 45 and 50 percent, do you want to select some others that are, for example, 40 to 45?

MS. MUNN: Well, the issue then becomes do we want to continue in that mode or do we want to start looking at site selection rather than numerical POC.

MR. GRIFFON: I was keying more in at site at

this point, yeah.

MS. MUNN: Yeah, I agree.

DR. ZIEMER: Well, that's fine. Let's --

MR. GRIFFON: And my focus was -- I mean Hanford and Y-12 because we've got those site profile reviews coming, I thought it'd be good to have some real cases to look at while we're looking at the site profiles.

MS. MUNN: Uh-huh.

MR. GRIFFON: So with that in mind, I had 264 for Y-12.

MS. MUNN: Uh-huh.

DR. ZIEMER: 264 is male genitalia, Y-12, basically 28 percent POC.

DR. ROESSLER: Nervous system.

DR. ZIEMER: Any objection to that?

MS. MUNN: No.

DR. ZIEMER: Add that?

MS. MUNN: And some comment's been made about these smaller -- that 15 percent category that has been pretty much overlooked so far. How about 262, in that vein?

DR. ZIEMER: 262, acute leukemia.

MR. GRIFFON: That's 40 percent, isn't it?

DR. ZIEMER: Basically -- did you say 262, 39

percent?

MS. MUNN: Uh-huh, because of the facility.

MR. GRIFFON: Oh, oh, because of the...

DR. ZIEMER: Heppenstall?

DR. ROESSLER: What is that?

MS. MUNN: I have no idea, but that certainly falls in that 15 percent category of "others".

DR. WADE: Stu?

MR. HINNEFELD: Well, Heppenstall is an atomic weapons employer. I don't know right off the top of my head what they did, but it was one of the AWE sites.

MS. MUNN: Yeah, it was one of those 15 percenters they were talking about that they seldom see.

MR. GRIFFON: Right.

DR. WADE: Yeah, but I bring to mind Dr. Melius's comments to the Board last time that said, you know, when we -- when we decide on site profiles to review, we're looking at those that employed the most. And he was worried that these small sites would be lost, so I think there is some reason to give consideration to them.

MR. GRIFFON: Sure.

DR. ZIEMER: You wish to include that one?
MS. MUNN: Uh-huh.
DR. ZIEMER: Okay, 262 is in.
MS. MUNN: In that same vein, 108 is --
DR. ZIEMER: 108, Nuclear Materials and Equipment Corporation, that's -- actually that's a high -- it's a 63 percent, colon.
MS. MUNN: Yeah.
MR. GRIFFON: Is that 108?
DR. ZIEMER: 108.
MR. GRIFFON: I have on here -- well, we're jumping around a little bit -- sticking with the theme of the smaller sites, I have 159.
MS. MUNN: Uh-huh.
DR. ZIEMER: 159 is basically a 30 percent probability of causation, stomach cancer, Chapman Valve. Any objections?
MS. MUNN: No.
DR. ROESSLER: I'd like to ask a question --
DR. ZIEMER: We'll include that.
DR. ROESSLER: -- about 190. That one, the four significant digits, is exactly 50 percent, which doesn't fall in our table at all. We have one group 45 to 49.9 and then we have another group greater than 50.

DR. ZIEMER: Well, it should be 50 or greater because 50 is compensable.

DR. ROESSLER: Okay.

DR. ZIEMER: And the table or the pie chart should really read 50 and greater, not greater than 50.

DR. ROESSLER: Yeah, okay. I'm not recommending that one. I just was curious.

MS. MUNN: And there's 138, it's Bridgeport Brass.

DR. ZIEMER: 138, colon cancer, just over the -- it's 53 percent --

MS. MUNN: Uh-huh.

DR. ZIEMER: -- Bridgeport Brass. Any objections? Okay, we'll include that, 138.

MR. GRIFFON: I got like two Hanfords and a Y-12 left. I don't know what count you're up to, Paul, but I'd like to...

DR. ZIEMER: 1, 2, 3, 4 --

DR. ROESSLER: Nine, I think.

MS. MUNN: Nine.

DR. ZIEMER: I have nine so far designated, so we can take several more.

Which one are you looking at?

MR. PRESLEY: 253, if I may speak.

DR. ZIEMER: Yes, 253, esophagus, 34 percent at Jessop Steel.
MS. MUNN: Uh-huh.
DR. ZIEMER: Okay.
MR. GRIFFON: Do we -- do we know what Jessop Steel -- is this similar to Bethlehem Steel, they did uranium -- does anyone know?
DR. ZIEMER: Stu or Jim, do we know what Jessop Steel is?
MR. HINNEFELD: I don't recall for certain, but I do believe they were a metal-forming AWE.
DR. ZIEMER: Thank you.
DR. ROESSLER: How about another Hanford, Mark?
MR. GRIFFON: Yeah, I got...
DR. ZIEMER: There's a Hanford that's right at exactly 50 percent that looks -- it's a melanoma, 256.
MR. GRIFFON: I didn't have that one, only because of the type of cancer, really, but...
MS. MUNN: There's a similar POC from Bethlehem Steel, 279.
DR. ZIEMER: What do you want to do on 256?
DR. ROESSLER: I would vote for that one because of the type of cancer.
MS. MUNN: Uh-huh.

DR. ZIEMER: 256 --
DR. ROESSLER: But I don't know what --
DR. ZIEMER: -- any objection?
DR. ROESSLER: -- what others would think about that.
MS. MUNN: Go for it.
DR. ZIEMER: Okay, I'm going to include 256. What was your other one, Mark, you had?
MR. GRIFFON: 130.
DR. ZIEMER: Mark has suggested 130. It's a pancreas, 20 percent, Hanford. Any objection?
MS. MUNN: No.
DR. ZIEMER: Okay, I'll include that. I have 12 now designated. We can take three more. And we've covered -- we have an interesting mix of cancers and percentages here -- and facilities.
MR. GRIFFON: I have a -- well, let's see, a couple of different ones -- 201 is one of them.
DR. ZIEMER: 201, a bladder, Oak Ridge National Lab, that -- right at 50 percent. Yeah, that looks interesting.
MR. GRIFFON: And then right --
DR. ZIEMER: Any objections to 201?
MS. MUNN: No.

MR. GRIFFON: And 204, because it was Y-12.
DR. ZIEMER: Y-12, 204, 23 percent on a colon. Any objections?
MS. MUNN: Huh-uh.
DR. ZIEMER: Okay, include that.
MS. MUNN: There's a high POC at 151 from another one of the small sites.
DR. ZIEMER: 151 is a 72 percent --
MS. MUNN: Uh-huh.
DR. ZIEMER: -- chronic myeloid leukemia from Energy Technology Energy (sic) Center. Want to include that?
MS. MUNN: I was just looking because of the site more than anything else.
DR. ZIEMER: How are we on Hanfords, before we decide this? There's a --
MR. GRIFFON: I have one more Hanford that I was going to recommend, but I don't know how many you have total.
DR. ZIEMER: We have three Hanfords in the list -- on this -- on this list.
MS. MUNN: Yeah, three.
MR. GRIFFON: And you have a total of 14 so far, or how many do...
DR. ZIEMER: Fourteen.

MR. GRIFFON: I mean I would say possibly 219 is a Hanford --
DR. ZIEMER: I was looking at that one, also, the breast cancer at Hanford?
MR. GRIFFON: Yeah.
DR. ZIEMER: That one, or what was the other one, Wanda? Or -- was it Wanda that --
MR. GRIFFON: The ETEC, whatever that place is.
DR. ZIEMER: What was that number and...
MS. MUNN: 151.
DR. ZIEMER: 151 versus -- versus --
MS. MUNN: It's a high POC but an interesting site.
DR. ROESSLER: How many of the smaller sites have we picked? We might almost overdo that.
MS. MUNN: It's a possibility.
MR. GRIFFON: Well, if we look at Stu's sheet --
DR. ZIEMER: We have three small sites on this right now. We have that Heppenstall, Jessop and Chapman.
DR. ROESSLER: I think I'd go for 257, the one that -- which one did you pick, Mark? It was breast cancer at Hanford.
MR. GRIFFON: Was it 219?

DR. ROESSLER: I thought that one was a good one.
DR. ZIEMER: 219 was the Hanford breast cancer.
MS. MUNN: Uh-huh.
DR. ZIEMER: Any preference?
MR. PRESLEY: Can I speak?
DR. ZIEMER: Yes.
MR. PRESLEY: Look at 76, please -- 176.
MS. MUNN: Ah, a good one.
DR. ROESSLER: Ooh, yeah, very good. What does "other respiratory" mean?
MR. PRESLEY: That I -- that I don't know.
DR. ZIEMER: Other respiratory, Stu? Well, that -- that's a National Cancer category.
MR. HINNEFELD: Right, it could be --
DR. ZIEMER: Other than lung.
MR. HINNEFELD: It could be anything in your breathing pipe --
DR. ZIEMER: Yeah.
MR. HINNEFELD: -- from the back of your mouth or back of your nose, through your (unintelligible) --
DR. ZIEMER: Into the bronchials and --
MR. HINNEFELD: -- through the bronchials, so it's -- it's essentially respiratory tract

before the lung. It's ET-2 in the ICR-- ET-1 and ET-2 in the ICRP-66 lung model.

DR. ROESSLER: That's interesting, and on the years worked.

MS. MUNN: Isn't it.

UNIDENTIFIED: (Off microphone) Just one year.

MR. PRESLEY: Yes, and the work decade, too.

MS. MUNN: Yeah, barely made it.

DR. ROESSLER: Yeah, that one's interesting.

DR. ZIEMER: You want to include that then?

MS. MUNN: Yeah.

DR. ZIEMER: Is that agreeable? Okay.

MS. MUNN: A lot going on with (unintelligible).

DR. ZIEMER: Then case 176, West Valley, the other respiratory. That gives us 15 cases from this list, and if, without objection, we go back to the random list then and pick five more. I'm looking on the random list to see if we have any more that are in the 45 to 50 category.

MS. MUNN: Well, you have 058 there, back at Savannah River -- no.

MR. GRIFFON: I think I'd stay away from Savannah and Hanford and Y-12.

MS. MUNN: Yeah, a lot of that.
MR. HINNEFELD: Excuse me --
DR. ZIEMER: Stu.
MR. HINNEFELD: -- I do want to caution that the full -- if it's a full estimation case on the randomly selected list, that case also appears on the -- on the list you just worked from.
DR. ZIEMER: Right.
MR. HINNEFELD: So if you select a case on the randomly selected list that says full dose reconstruction, you want to make sure it's not one that you selected off the other list.
DR. ZIEMER: Right, thank you. Yeah, and that -- that one is probably one that we selected. In fact it is, I see it, so we've already selected it. Yes, Robert?
MR. PRESLEY: Could you look at one -- at 0110? That's from Pinellas. We have not done anything, to my knowledge, from Pinellas, and it's a 1960 date.
MS. MUNN: That's back on the other list.
DR. ZIEMER: What's the number on that one again?
MR. PRESLEY: 0110.

DR. ZIEMER: Maybe the zero -- 010 -- 010.
MS. MUNN: Yeah.
DR. ZIEMER: Okay?
MS. MUNN: Squamous cell.
DR. ZIEMER: Objection? Okay.
MR. GRIFFON: Actually right after that, 111 (sic), I was looking at.
DR. ZIEMER: Okay, 111 (sic), pancreas, Feed Materials Production Center, 33 percent.
DR. ROESSLER: What about one from the Nevada Test Site, like 017? The POC, the cancer and the years worked is kind of interesting on that one.
MS. MUNN: Uh-huh, it is.
DR. ZIEMER: Any objection?
MS. MUNN: No.
DR. ZIEMER: What do we have from Nevada Test Site so far, Mark? Are you tracking there?
MR. GRIFFON: Yeah, I don't think we have much. Overall we've only got three in the past 60 cases so it's not...
MS. MUNN: Here's a low POC from Los Alamos, 035.
DR. ZIEMER: What number?
MS. MUNN: 035.

DR. ZIEMER: 035, Los Alamos case, any objections to that one? What about 034 from Idaho? Do we need any more Y-12s?
MR. GRIFFON: I don't think -- not this round.
MS. MUNN: 034 is good.
MR. PRESLEY: 068 is a low one from Los Alamos, also. It's got a 1970 time frame, that's urinary organs.
DR. ZIEMER: I'm looking for --
MR. PRESLEY: (Off microphone) Bridgeport Brass (unintelligible).
DR. ZIEMER: We just need one, either -- either that Los Alamos, 068, or the Idaho, 034.
MR. GIBSON: Excuse me, Paul.
MS. MUNN: Let's do 034.
DR. ZIEMER: Mike?
MR. GIBSON: Back on the other list for the -- all the cases with the full dose estimate, there's one I see here from Mound, which we haven't done any yet. It's a -- 234, it's bladder cancer, 19.65 probability of causation.
MR. GRIFFON: What number was that, Mike?
MR. GIBSON: 234.
DR. ZIEMER: 234? We can certainly add -- there's no reason we can't do 16 from that

list. Any objections to that, do the Mound? Okay.

DR. ROESSLER: Let's do it, sure.

DR. ZIEMER: Let's put that back in then. So that's 234. So we have 16 now from the full dose list and then we have the following from the random list -- let's double-check the randoms now. It'll be 010, 011, 017 and 035. Is that correct? Everybody agree? That's four, and we have 16 on the other list.

MS. MUNN: So we decided against -- oh, we did 034, not 035, whichever.

DR. ZIEMER: So just for the record, can we have a motion that we recommend to the full Board these four cases from the random list, plus the 16 cases from the full dose estimate list.

MS. MUNN: So moved.

DR. ZIEMER: Is there a second?

MR. GRIFFON: Second.

DR. ZIEMER: Any discussion?

(No responses)

All in favor, aye?

(Affirmative responses)

Opposed?

(No responses)

Motion carries, and we will recommend these then to the Board. Stu, thank you very much for providing the matrix material for us. And SC&A, you'll have your work cut out for you here on this next batch as they get under way. Any other questions or comments now on dose reconstruction?

Okay, let me -- while we're on this topic, let me ask, where are we on the first 20? Did we have any out-- we closed everything, didn't we, on...

UNIDENTIFIED: (Off microphone) No.

DR. ZIEMER: Oh, were there some things going back to NIOSH for -- yes.

MR. HINNEFELD: We -- we have a series of actions to do and provide a report to you on what we did. So we -- we don't have a report on those today --

DR. ZIEMER: Oh, okay.

MR. HINNEFELD: -- or this week, but we do have actions in our house to -- to resolve comments where we agreed yes, we need to go back and look at and re-evaluate --

DR. ZIEMER: But that is the final step. We

don't necessarily need to take action today on that -- or even at this meeting --

MR. HINNEFELD: That was done -- that was done at the last meeting, and as I understand it, we have -- the next action is ours to provide --

DR. ZIEMER: There were a few items where we had to come to closure, but --

MR. GRIFFON: Right, well, there were several items that we deferred to the site profile review process.

DR. ZIEMER: Right.

DR. WADE: But just for the record, remember that -- we talked about the next Board meeting. This is a special Board meeting that we called to deal with issues at Mallinckrodt, so --

DR. ZIEMER: Right.

DR. WADE: -- we would expect to hear from NIOSH at the next Board meeting.

MR. HINNEFELD: The October meeting was really what we were --

DR. ZIEMER: And likewise then, action on the second 18 would -- where are we on that? I think we're somewhere in the matrix process on that. I -- Hans -- he's not here.

DR. MAURO: Yes, they've all been completed.

They've -- all the checklists have been completed, and I believe we're in the process of filling out the -- working with Mark in filling out the matrix and the -- so we're well along on that. And as Hans pointed out, the last set of 22, we're about halfway through, and you'll be getting the full report before the end of the fiscal year.

DR. ZIEMER: Good. Thank you very much.

DR. WADE: Just for the completeness of the record, what do we expect to happen at the next Board meeting relative to the second batch of 20? We'd have your report at that point, John?

DR. MAURO: The second set of 18, you have the report.

DR. ZIEMER: Right.

DR. MAURO: The report's in your hands. My expectation and my -- would be the same process we went through, working with the Board -- with subcommittee on the matrix and going through the scorecard --

DR. ZIEMER: Are we awaiting responses on NIOSH from that second 18, or are they awaiting responses from us, or does it -- I think we have your comments --

DR. MAURO: Yes.
DR. ZIEMER: -- on the second 18.
DR. MAURO: I think the ball is in the court of NIOSH in terms of action items related to our findings on the first (sic) set of 18 to be loaded into the matrix and then go through the closeout process at our next meeting.
DR. ZIEMER: Right.
MR. GRIFFON: So I would hope -- and maybe we can try to get that on the subcommittee meeting for the next --
DR. ZIEMER: For the next meeting.
MR. GRIFFON: Yeah.
DR. ZIEMER: Right. Thank you.
DR. WADE: Just -- NIOSH -- Stu, if I could trouble you again.
MR. HINNEFELD: Sure.
DR. WADE: Again, since my -- one of my few tasks is to schedule the agenda, would we have the materials available to the subcommittee before the October meeting so that they could take up that issue at the October subcommittee, on the second 18?
MR. HINNEFELD: Okay. We can have -- we can get to the step in the process where we were on

the first 20 at the last meeting. If -- you know, we have a matrix with the findings in -- you know, and our response to the finding, and then the amount of convergence that can occur between now and the end of October is a little open -- up in the air as to how much opportunity there'll be for that, but is that the desire then, we work that convergence, you know, we -- we provide our response, we talk to SC&A about -- well, what about this and -- and sort of come to an agreed-upon -- okay, this one goes away and this one we really need to go sort out. There's a -- I think we might be able to do that by the next meeting, to be at that point.

DR. WADE: As much convergence as possible, but we'll assume that intellectually at the next subcommittee meeting we'll be dealing with this issue of the matrix in front of us, the NIOSH comments, a report on convergence, and the subcommittee then will take up the open issues.

MR. HINNEFELD: Okay.

DR. WADE: And we'll close on the first 20 you said.

DR. ZIEMER: Okay, thank you very much. That's

good progress on the dose reconstruction selections.

We want to move now to Bethlehem Steel site profile.

DISCUSSION OF CANDIDATE SITE PROFILES FOR REVIEW BY SC&A

DR. WADE: I would suggest maybe while we're on this vein we could deal with the issue of the candidate site profiles for review. I mean we're talking about tasking SC&A, and it seems that would be a natural flow, if that's okay.

DR. ZIEMER: We can do that.

DR. WADE: Stu, are you in a position to walk us through what we have on site profiles?

MR. HINNEFELD: Upcoming site profiles?

DR. WADE: What we have in our -- we have a tab that has been provided looking at the... Maybe I can give you that.

DR. ZIEMER: Well, I think we also got a color version of this, the green and red, also on -- by e-mail.

MS. MUNN: Yeah, I think we did all of the other.

MR. HINNEFELD: Okay, the tables you have in front of you is the status table for progress

on site profile documents -- site profile chapters. You know, each -- all six sections are -- for each site are listed across the top and the sites are listed down the side, and so this is the -- up-to-date as of -- it looks like last week -- progress. Anything that's marked "approved" is approved and out there. There are a few things here that are marked -- that are not quite incomplete (sic), they'll either have an ORAU or an OCAS in it, which means that -- if it's OCAS, that means we have it and we are reviewing it, and put to the right comments or approve. If it's on the ORAU side, that means that they either haven't submitted it, but more likely it means they're resolving comments we provided them during our review. So anything that is approved all the way across is the final product available for review.

And then the remainder of the sites down through the well, it's -- LLNL, Lawrence Livermore, should be done, you know, forthwith. The remainder of the sites that are all white at the bottom of the second page are scheduled for this calendar year, so they should also be

resubmitted -- the original version should be submitted to us by December. I think their due dates are all actually in December, if I'm not mistaken. So these are the -- the site profiles that are complete and available for review are the ones that are green all the way across.

DR. ZIEMER: Okay. Any questions on these?

(No responses)

Where's Mallinckrodt on this list?

MR. HINNEFELD: This list I believe is for this fiscal year and --

DR. ZIEMER: Oh, I gotcha.

MR. HINNEFELD: -- Mallinckrodt was on a previous list.

DR. ZIEMER: Okay. Now John, could you -- you or one of your staff give us a quick update on where you guys are in terms of your current review process on site profiles?

DR. MAURO: The full scope of services for this -- that'll end at the end of this fiscal year included nine site profile reviews. What is still pending are Nevada Test Site, Rocky Flats, INL and Y-12. Y-12 is completed. It's sitting in our office, but we have to sit on it

until we get -- and Joe could tell us a little bit more about it -- authorization to release it from the Department of Energy's declassification process. So that's been completed for quite some time.

The other documents, the INL site profile is -- is in draft form. In fact, I think I have it in my briefcase and I'm reviewing it. We're probably two weeks away from delivering that report to you.

Nevada Test Site and Rocky bring up the rear and we have the -- our expectation is that we will be delivering that -- those two reports to you before the end of September. The only qualifier is the degree to which we will be able to get through the complete process, the complete process being -- especially with regard to Rocky -- issues related to declassification. Our expectation is that we would move that report out and avoid finding ourselves in the delay associated with declassification issues and try to get out what we would call a non-classified version of the report as best we can so that will have that product in your hands before the end of the

fiscal year.
The other areas -- I'm trying to -- Nevada Test Site, that is probably the one that is going to be going out perhaps without the benefit of some of the -- as much of the review cycle that we would have liked to have had in terms of working all of the interviews into the process. So for I would say two out of the four remaining, they will be complete documents, but may not have benefited from as much of the review cycle that we would've liked and as a result that may necessarily -- that aspect, what I call the back end of the process for those two site profile reviews, may very well have to carry over into next fiscal year.
DR. WADE: John, just for the record could you specify the nine site profiles that you looked at?
DR. MAURO: Okay. It's Bethlehem Steel, Mallinckrodt, Savannah River, Hanford, Iowa Ammunition Plant -- that's five -- Nevada Test Site, Rocky, Y-12 -- I'm missing one --
UNIDENTIFIED: (Off microphone) INL.
DR. MAURO: -- INL, thank you.
DR. ZIEMER: Everybody get that list?

MS. MUNN: Uh-huh. Uh-huh.
DR. ZIEMER: So there may be a little tail over on some of these into next fiscal year, particularly -- did you say Nevada and INEL?
DR. MAURO: Yes, I believe that there -- the way things are unfolding in the six-step process, I believe that there will be several site profiles that clearly closure of the -- of issues will carry over to next fiscal year.
DR. ZIEMER: The main body of your review, though, is going to be largely done this fiscal year.
DR. MAURO: Yes, a good way to look at is virtually 90 percent, 80 percent of the work on -- the ones that are --
DR. ZIEMER: The front end work.
DR. MAURO: The front end work. You'll have a product that will be of sufficient completeness that will allow the process to move forward productively. Unfortunately there will be some carryover because of the six-step process, and in fact in our proposal of work to you folks that I guess will be the subject a little later on this week, you'll see that we -- in our proposal to you we've set aside some resources,

recognizing that there would be some carryover, to continue that work.

DR. ZIEMER: Thank you. Mark?

MR. GRIFFON: Just in terms of selection for future site profiles that -- the note that Mallinckrodt and Bethlehem Steel aren't on that other list. Are there other -- are there a lot of others that are not on there that are completed site profiles that we might have as part of our pool to select from? I'm getting a little confused at what we have available to select from.

DR. ZIEMER: Well, what's available to select from I guess is on this table. I mean you have some that are done, like Bethlehem and Mallinckrodt.

MR. GRIFFON: Mallinckrodt and Bethlehem weren't on there, but are there other ones on there that we didn't review -- not on there that we didn't review.

MR. HINNEFELD: The gaseous diffusion plants. Are they on there? Okay.

MS. MUNN: IAAP is done and gone, fortunately.

DR. WADE: And the question, Stu, is -- the subcommittee needs to understand the universe

of sites essentially available to it.

MR. HINNEFELD: I might have to go do a little research to know for sure.

MS. MUNN: Well, we did IAAP.

MR. GRIFFON: Especially from the smaller sites. That's where I'm really at a loss.

DR. ZIEMER: Just for clarity, the GAO date I think is the date that NIOSH told the Government Accounting Office that -- was your target date for completion of the profile. Is that correct?

MR. HINNEFELD: Target date for completion of I believe the initial draft of the profile.

DR. ZIEMER: Initial draft, uh-huh.

MR. HINNEFELD: And a 60-day implementation period following that.

DR. ZIEMER: Right.

DR. TOOHEY: The only ones not on this list that come to mind are Blockson Chemical and -- that's -- that's the only one I can think of right now that's not on here. Sandia -- no, that is on there, never mind.

DR. ZIEMER: Sandia is on the list.

DR. TOOHEY: Yeah. Okay, that's about the only one.

DR. ZIEMER: Okay. Lew?
DR. WADE: No.
DR. ZIEMER: Oh. Okay, any other questions? And remind us, Lew, how many have to be selected? Can we give that number this time, or do we need to wait?
DR. WADE: If I had to plan a number, I would say six. I mean, I think it remain-- the exact number will have to await the full Board discussion as to tasking the contractor for next year and it will eventually await budget determinations, but I think six. From my very selfish point of view as Technical Project Officer, we want to keep the contractor working at the start of the year.
DR. ZIEMER: As a minimum we can specify what the next six cases will be, regardless of whether we do them all this year or not.
DR. WADE: I think that would put us in a very good position.
DR. ZIEMER: In terms of the dose reconstruction cases being reviewed and so on, do the Board members have any feeling for which -- which of these you believe should be near the top of your list? For example, we have

cases from Hanford coming into the picture, probably Los Alamos. What is your pleasure, Board members? Any -- any preferences?

DR. ROESSLER: It seems Hanford would be high on the list.

DR. ZIEMER: Let's see if we can identify -- put it out as a strawman.

How many -- any objections to Hanford being in the next list of six?

UNIDENTIFIED: Where is Hanford?

MR. GRIFFON: Hanford is completed.

MS. MUNN: It's still in Washington.

MR. GRIFFON: Hanford's been delivered to us.

DR. ZIEMER: Yeah, we have Hanford. I didn't mark it down.

MS. MUNN: A monster.

DR. MAURO: Are you referring to cases now? I didn't quite follow the --

DR. ZIEMER: No, no, we're looking at site profiles, but I forgot to check off Hanford on the list here.

DR. MAURO: When I was listening to the discussion, I -- in my head I thought you were talking about a priority of the next 60.

DR. ZIEMER: Next six, yeah.

DR. MAURO: Next six -- oh, not 60. But there was a thought came to mind that might be worth consideration and I'll -- it also was a step backward, though. When we look back over the nine site profiles that we reviewed, certain of them we have raised certain issues that we find -- and there's general consensus in our group -- that are very compelling. Example, Hanford we have -- have cert-- serious concerns with the neutron to photon ratios and how they're developed. We consider that to be something of profound importance in dose reconstruction and how you go about selecting your neutron to photon ratio. Each -- out of the nine that have been done, maybe three or four of them have raised certain concerns that we consider to be extraordinary importance because they have the potential to have a very large effect on doses and also on a large number of cases. We've never talked about that before, and perhaps that should somehow play out when we're selecting realistic cases for the purposes of doing the audits themselves. So I apologize for stepping back a bit, but it was -- while you were talking I was thinking in terms of

priority of the 60 cases and that -- that's something that crossed my mind.

DR. ZIEMER: Thank you.

DR. WADE: But from a historical point of view, the last time the Board took up this issue it went with the largest employers, as I understand. I mean now you could continue with that and you could get numbers, you could use a different logic. I think we're much more experienced now -- also the interconnectedness of this whole process -- so I think it's a good discussion to have.

MR. GRIFFON: I got a -- I got a list of seven.

DR. ZIEMER: Uh-huh, go ahead.

MR. GRIFFON: I'm looking at Fernald, Los Alamos, Mound, X-10, LLNL -- Lawrence Livermore, and then on the small sites, Bridgeport Brass and Combustion Engineering. I should note -- I just caught it myself -- is that it's not approved yet, so --

MS. MUNN: Yeah.

MR. GRIFFON: -- and I didn't realize that when I was checking off --

MS. MUNN: Yeah, we can do that.

MR. GRIFFON: So maybe I do have six, I don't

know. I'd just throw those out there.

DR. ZIEMER: Well, it's very close to -- it's got a 9/05 target date on it.

DR. WADE: Would you say those again for the record, Mark?

MR. GRIFFON: Yeah, Fernald, Los Alamos, Mound, X-10, Lawrence Livermore, Bridgeport Brass and Combustion Engineering.

DR. ZIEMER: Just -- yeah, Robert, you have a comment on that?

MR. PRESLEY: Can I speak? Yes.

DR. ZIEMER: Yes.

MR. PRESLEY: Where are we on Pinellas? Pinellas is marked ORAU.

MR. HINNEFELD: Well, generally we're in comment resolution. That would mean we've commented and it's back to ORAU to resolve our comments. So that's where that is at the time.

MR. PRESLEY: The reason I bring Pinellas up, it's -- it's different from anything we've done. I believe it's a non-uranium type facility. It would be interesting to see what they find out on their site profile for a non-uranium facility.

DR. ROESSLER: Lawrence Livermore is -- doesn't

look like it's near completion. It does have a 6/05 date on it, but there's a lot of red and yellow on that. I'm wondering how -- if we consider that, how far along that is.

DR. ZIEMER: Dick Toohey maybe can speak to that.

DR. TOOHEY: I just happened to have a message regarding those on my portable mind received this morning. On Pinellas I think the only things that are open, and this should hopefully match what's on your color chart there, is the internal and external TBDs, and they're in the final comment resolution stage. So if NIOSH is happy with our response to their comments, those will be signed off shortly.

Livermore, the introduction, environmental, internal dosimetry and external dosimetry TBDs are also -- we think -- we've responded to NIOSH comments on it and they're back to NIOSH for their review and approval of those comments. So again, if we were successful in addressing their comments, those should be approved shortly.

DR. ZIEMER: Okay. Thank you very much. So actually we have a suggestion of seven or eight

possibilities. Remind us, though, Pinellas -- didn't Pinellas do largely timers and so on? Did they have maybe some tritium work? Tritium was the main thing there, right?

MR. PRESLEY: Tritium, beryllium.

MR. HINNEFELD: Tritium, and they had some neutron generator work, as well.

DR. ZIEMER: Wanda?

MS. MUNN: Since Lawrence Livermore is still having work done on it, if we wanted to look at a laboratory would we do just as well to look at Argonne West?

DR. ZIEMER: That's a possible suggestion, Argonne West. Uh-huh.

MS. MUNN: Yeah, it is.

DR. ZIEMER: Let me go down through these and maybe we can just order them. Any objection to Fernald? Los Alamos? Mound? And X-10? Those four are completed and are probably excellent candidates. Any objection to using those as, for example, our top four? Not necessarily in that order, but -- there appears to be no objection.

Now let's look at -- we have Lawrence Livermore -- I'm sorry, what -- Pinellas --

DR. ROESSLER: Argonne West.
DR. ZIEMER: And Argonne West.
DR. ROESSLER: And Bridge--
MS. MUNN: Uh-huh.
DR. ZIEMER: And we have two -- two of the AWE sites, Bridgeport Brass and Combustion Engineering.
MR. GRIFFON: I guess I would be willing to take Combustion Engineering off the list for now since it's got no -- you know, not completed yet.
DR. ZIEMER: Let me suggest that we include Combustion Engineering in our list so we have at least an AWE site.
MR. PRESLEY: You mean Bridgeport Brass?
DR. ZIEMER: I meant Bridgeport Brass, say that three times rapidly, and then perhaps select as our sixth one, one of -- Argonne, Pinellas or Lawrence Livermore. And then the other two -- carry those along as the next two in case the -- in case we get there.
DR. WADE: Resources available.
DR. ZIEMER: Resources available.
MR. GRIFFON: I will throw out one other thing that I just thought of, Blockson Chemical --

and the only reason I bring that up is because in previous meetings we've had some discussion on how the radon issue is being handled and I know that -- that we've had several -- quite a bit of dialogue on that and I don't think -- it wasn't on the list, that's why I forgot about it, but I'm assuming it's complete. Right?

MS. MUNN: It's done.

MR. GRIFFON: Or is it?

DR. WADE: You need to ask...

UNIDENTIFIED: Blockson Chemical?

MR. GRIFFON: Blockson Chemical.

DR. ZIEMER: I think Stu said it was --

MR. HINNEFELD: Beg your pardon?

MS. MUNN: Blockson Chemical, is it complete?

MR. HINNEFELD: You're talking about radon at Blockson? Is that what you're talking about?

MS. MUNN: Uh-huh.

DR. WADE: Is it -- is it available for us to consider for review?

DR. ZIEMER: It's done, Blockson is done.

MR. HINNEFELD: Right, Blockson -- the site profile is published, right.

MR. GRIFFON: But the ra-- the radon section is still reserved at this point?

MR. HINNEFELD: Yes.
MR. GRIFFON: Oh, okay, so maybe we should hold off on that until -- all right.
DR. ZIEMER: Okay.
DR. ROESSLER: I would speak for Pinellas for the reasons Bob mentioned. It's a very -- seems like a very different site and I think that should be looked at.
DR. ZIEMER: How do the rest of you feel? You want to add Pinellas then as the sixth one?
MS. MUNN: Yes, uh-huh.
DR. ZIEMER: Okay, Pinellas will be six, and then perhaps Argonne West and Lawrence Livermore can be seven and eight then. So we have a pool here to draw from. Can I have a motion to that effect?
MS. MUNN: So moved.
DR. ZIEMER: And seconded?
MR. GRIFFON: Second.
DR. ZIEMER: Okay. The motion is that Fernald, Lawrence -- or Los Alamos, Mound, X-10 and Pinellas and Bridgeport will be our first six. I don't know that we necessarily have to specify the order at this time, do we?
DR. WADE: Well, I mean I think we will have to

do something first. If you want to leave that to my and the contractor's discussion, that's fine. If you want to inform that decision, please do.

DR. ZIEMER: Okay, we'll come back to that. And then Pinellas and -- or I'm sorry, Argonne West and Lawrence Livermore would be seven and eight.

All in favor, aye?

(Affirmative responses)

Any opposed?

(No responses)

Motion carries, and we'll recommend that to the full Board. Do you wish to prioritize these first six for the contractor? Mark?

MR. GRIFFON: I would say let's hold off and maybe get some input from them, the contractor, 'cause I'd like to also look at the maybe pool of dose reconstructions and what NIOSH is prioritizing as far as case work. That might drive our decision on what we want to look at.

DR. ZIEMER: And some of those issues, like the -- was it the photon to neutron ratio issue -- that's surely going to come up at some of these places like Los Alamos, big time, and probably

at X-10, Lawrence Livermore. Mike?

MR. GIBSON: Some of the sites -- we might also need to think about -- they're scheduled for closure here in the next six months to a year and it's going to be kind of hard for me to track people down to review the site profiles, so you may want to try to prioritize those.

DR. ZIEMER: That's a good point, yeah.

MR. GRIFFON: Yeah, actually Pinellas is good for that reason.

DR. ZIEMER: Pinellas is -- and what's Mound's status?

MR. GIBSON: It's similar.

DR. ZIEMER: It's similar. Right? So get them while you can. Uh-huh, good point. Thank you.

DR. WADE: So maybe we can hear from the contractor and NIOSH when the Board discusses this if there are any thoughts that need to be considered as to priority.

DR. MAURO: Just one thought comes to mind now that is of a practical matter. The degree to which the site profile review has been completed prior to us doing the detailed review of the cases -- it's almost a -- when the ca-- the three sets of 20 cases move through the

system it would be desirable -- for example, let's say the next set of 20 that move through starting October 1st, it would be very desirable for those -- for that set of -- first set of 20 to be cases that already have sitting behind them the fact that we've done a site profile review. So almost to the extent that it's possible -- and I realize the logistics are very difficult -- but when we have the site profile review done and then we are asked to review a case, the power of our -- the ability for us to review that case increases dramatically by having that behind us.

DR. ZIEMER: Right. Thank you.

DR. WADE: Mark.

DR. ZIEMER: Mark?

MR. GRIFFON: I mean I was just going to say -- I was -- I was thinking a similar -- similar thought as you, John, but I could also see a benefit of sort of parallel processing because I know in Mallinckrodt this process that we've gone through -- we looked at the site profile, but we also found that it was beneficial to see a couple of -- of how they were going to do the dose reconstruction, actually how they were

going to apply some of those things in the site -- and so either before or parallel to, I think I'm in agreement.

DR. WADE: Just for the record, I think this whole issue of timing of case review, site profile reviews, SEC petitions is something the Board really needs to discuss. They are all interconnected and I think the Board really needs, when it sits as a full Board, to talk about these issues.

DR. ZIEMER: Okay. Anything further on the site profile review schedule? Okay. I'm looking at the clock here to see whether we have time to get underway on Bethlehem. We didn't schedule a particular lunch break, but we're almost at the noon hour. So rather than try to get underway on a new topic I think I'll declare a recess here, and I'm not really certain what the eating arrangements are. Do we need more than an hour in this area? We should try to be back by 1:00 if we can. Thank you.

(Whereupon, a recess was taken from 11:50 a.m. to 1:20 p.m.)

MALLINCKRODT SITE PROFILE REVIEW

DR. ZIEMER: We're ready to go back into session. I trust everybody had a good break. There are two main items this afternoon. One is the discussion on the Mallinckrodt site profile. The other is discussion on Bethlehem Steel. Jim Melius wanted to particularly be here for the Bethlehem Steel discussion and is due to arrive yet this afternoon. So since Jim is not here yet, if there's no objection, we'll proceed with the Mallinckrodt material and begin discussion on that.

To kick that off I'd like to call attention -- in your Board booklet there's a tab called --

DR. ROESSLER: Mallinckrodt.

DR. ZIEMER: -- Mallinckrodt. What a surprise. And there behind that tab you'll find a summary of the action that the Board did take at the last meeting in identifying priority issues relative to that petition and that site profile. And there were six tasks that were identified at that time, and these are enumerated in the material there, tasks where we asked NIOSH to complete those and for those to be worked with our contractor so that we could identify any issues that were not

resolvable and identify any outstanding issues that the Board may need to consider in its final decisions. So I think it would be useful if both NIOSH and SC&A had an opportunity to summarize for us what has transpired.

Of course you're all aware that we did have a workgroup meeting of the Board with NIOSH and SC&A and the petitioners about a month ago, as well. And I think the Board members have also been apprised as we proceeded with all of the exchange of information, including the exchanges between Dr. Neton and Dr. Makhijani, in terms of attempting to resolve a number of the issues and questions.

Perhaps I could ask Jim Neton or one of his staffers to kick it off and summarize your sort of take on the six issues, and then if Dr. Makhijani could follow it up after that. And this doesn't necessarily have to be the formal presentation, but if you could summarize for us -- 'cause I think the Board members also have been tracking this pretty closely, but just to get us all on the same page here, summarize where you think we are and Dr. Makhijani then can summarize where SC&A has come down. Then

we'll have a chance for questions and discussion.

DR. NETON: Yeah, I can do that. I'm not prepared I guess to do a formal --

DR. ZIEMER: No, I understand. This is just informal.

DR. NETON: I'm actually looking for my listing of the six issues so that I can speak to them.

DR. ZIEMER: I have an extra copy, Jim, right here.

DR. NETON: I got it.

DR. ZIEMER: Oh, you got it?

DR. NETON: A lot of water has gone under the bridge since last Board meeting and we've had very fruitful interchange with SC&A on these issues. I'll just go through them one by one. The handling of raffinate exposures, item 1-A, NIOSH should specify the radionuclide ratios for all ore processing. We have developed some ratios -- let me take a step backwards. The proposal at the last Board meeting was that we were going to use air sampling data and some multiplier on top of the urinalysis data to come up with intakes of the non-equilibrium ratios. Since that time NIOSH has reevaluated

data and has determined that for areas where there is high radium-bearing ores -- the early part of the extraction process, disequilibrium with radium, that we believe that the radon breath data that we have from the CER database, as well as the HASL data, are better approaches to bound the radium intakes. And then we will apply ratios to radium, not using -- we'll not rely on the uranium urinalysis data for that -- that aspect.

At the working group meeting we had, though -- and by the way, the ratios that we propose to use, and I think SC&A is in substantial agreement with us for the radium-bearing ores, are those that were derived from the raffinate -- the K-65 material that's been stored at the Fernald site. I got ahold of those ratios. It was suggested at the last Board meeting by SC&A that that might be a good point. It turns out almost all of that material came from Mallinckrodt and is stored there, so it's -- I think it's a pretty representative value to use.

It's a little hard to discuss without some graphics, I suppose, but when you get --

there's two -- there's two slits here. You have the radium-bearing ores, and then once you remove the radium, SC&A has correctly identified that the radon breath analyses are not useful for people who are working with -- these are raffinate workers -- who are working with raffinate material that is -- only contains thorium and its daughters and radium is gone. So we have proposed to use the 95th percentile of the air sample data in Plant 6, time-weighted -- 95th percentile of the time-weighted average air sample data and to -- to bracket the exposures from -- from that pathway, and then use ratios that we've developed based on a few literature values that we have.

And I have some -- oh, an update on those ratios, of what they are in my formal presentation, but I guess -- I can hand it out, I suppose, if we want later. But essentially what it ends up being is the ratio of thorium to -- protactinium is about I think 15 percent of the thorium value in the waste stream. And that's a fairly conservative estimate.

What we've done is we've taken the thorium

values, which we know the activity per gram is about ten to the fourth picocuries per gram, based on some laboratory analyses in the -- what -- this is what's known as the AM-7 material. And we've also looked at analyses of the Sperry cake, which is known to be a very good source of protactinium -- taken that value and assumed that that was present in the thorium ore itself. And that's where you end up with about a 15 percent ratio, 15 percent protactinium to thorium. And we are further assuming that the actinium daughter of the protactinium is in 100 percent equilibrium with the protactinium, even though we have seen some laboratory analyses that indicate that it is -- it is depleted in actinium, but we felt that it was not prudent to make that judgment based on just one laboratory analysis.

So I think -- I think we've got those ratios defined, and I'm sure SC&A would be willing to comment on that.

Once these ratios are developed and we have -- if we have radon breath data for a person -- let me just outline the scenario now -- we will use the radon breath data to estimate an intake

of radium and daughters, and then also take the thorium air sample data to estimate an intake in the thorium areas, and pick the scenario that delivers the highest dose to the worker and therefore the highest probability of causation.

Lacking radon breath data, we propose to use the 95th percentile of the radon breath data for residue raffinate workers, and that would be applied -- and then we would compare the 95th percentile intake for radon breath to 95th percentile of the -- of the thorium air concentration.

By job title, it's -- we've gone through the database and it appears to us that there's substantial overlap in jobs, to the point where it's difficult for us to separate out people who purely worked with raffinate and residues and who worked with uranium. Where we can, we will be very careful and select that, but in general I think a very large percentage of the workforce, particularly in Plant 6, are going to be assigned doses as if they were raffinate residue workers.

I think that covers most of what's in six --

item one.
The radon exposure issue has an interesting history behind it. If you recall the last Board meeting, SC&A proposed that the radon -- the doses -- systemic organs from radon inhalation could be substantial given that there are very large concentrations of radon in the air. And we've looked at that and we've looked at SC&A's model. We found -- there were some issues with that model. We've proposed our own model, came up with values -- it turns out that in general there is dose to systemic organs from radon. It's mostly -- for the most part it's due to the dissolved gas in the body and not the progeny that becomes systemic. But rather than assign radon doses to systemic organs, since we're using the radon breath data to bound radium intakes, we've done an analysis and we've distributed this widely that has demonstrated that is sufficiently claimant-favorable in itself so that we don't need to account independently for that source term to the -- to the claimants -- or the cases. So I think that we are in reasonable agreement with SC&A on this approach.

Application of dose correction factors, external organs, we've issued and distributed to the Board and others a Technical Information Bulletin that deals with this issue. We have determined that doses for certain work activities could be a factor of two higher than were recorded by the badge and we're prepared to make that adjustment in the appropriately-affected work-- workers.

The intermittent exposure issues, we -- we provided some data and some descriptions -- we picked an actual case and went through and -- I think that we are in agreement that the use of a chronic exposure model will in fact be claimant-favorable when there are intermittent acute exposures in the middle. So I think that we have general agreement there.

Specification of dose reconstruction methodology for unmonitored workers, we have decided that we will use the 95th percentile, as I indicated earlier, of the air sample data and if -- we pick the highest, the 95th percentile air data or the radon breath data for unmonitored workers, and that would include people working at SLAPS and in the D&D

activities. The unmonitored workers who were secretarial, administrative type locations, would get the -- the full distribution of the workers' dose. That is the -- you know, the best estimate would be the median value of that distribution and some assigned geometric standard deviation that brackets the range of exposures observed in the workforce itself. And then the example dose reconstructions for representative cases, it's going to be very difficult to talk through this, but we have constructed a -- we have picked -- picked a worker and reconstructed dose using radon breath, and then taken the same worker and assumed we didn't have radon breath and estimated the doses, and then we also used the same case using the 95th percentile air. It turns out that for those workers it's -- the metabolic organs are extremely high, and in general I think it'd be hard to imagine, for any reasonable duration of employment, that metabolic cancers -- that is liver, bone, leukemia, those type of cancers -- would not be compensated under this model. The metabol-- the systemic can-- the non-metabolic cancers

are -- are large, but they're not all over -- over the top. This is just one example. And again, the internal dose calculations that we did did not include external. The missed dose for external is going to be large, so that will be added, so it's -- it's very difficult to predict what percentage of the non-metabolic cancers would get paid, but -- but certainly, in my estimation, a fairly large percentage -- a very large percentage.

Then internal dose reconstruction for Plant 7 thorium workers, we have identified -- we picked a worker who had a bioassay sample for thorium 230. It turns out that the thorium -- the thorium 230 workers did have bioassay in the early period of operation. We've located about 70, 72 samples, somewhere in that vicinity, of thorium bioassay that were in the HASL database. It turns out that Plant 7, in our -- to our estimation, really only processed March '55 through April 19th of '55, and they stopped operation because of concerns of -- they needed to -- you know, it was not designed for this operation and they wanted to have better controls in place, and they restated in

1956. We don't know exactly in '56, but we would assume sometime early in the year -- January -- and processed through '57.

We have -- those 70 bioassay samples that I spoke of cover March and April of that operation, so we have bioassay data for that period, and we have located more than 200 air samples that covered the process in '56 and '57 in Plant 7E. I have them on my computer if anybody wants to see them in more detail. So we believe we have sufficient information for that particular operation to -- to do dose reconstructions for thorium 230. Those doses from the bioassay samples I -- are large. You can see the example case that we've handed out. The -- I think it was a pancreatic cancer, and that was 200 rem just from the one bioassay point, which is well over 50 percent.

That's a quick nutshell summary. I'll be more than happy to answer any questions.

DR. ZIEMER: Thanks, Jim. Let's see if there's any immediate questions from Board members.

If not, before Dr. Makhijani goes to the mike, I want to make sure that all the Board members received the August 16th draft from SC&A, which

is the -- let's get -- it's the third supplemental review of Mallinckrodt site profile -- third supplemental review of Rev. 1. And particularly in -- you'll notice not only in the Executive Summary but once you get into the report itself, particularly section three of that report deals specifically with the six priority issues. And is there anyone that did not get a copy of that? I want to make sure you all have it. Okay.

Okay, Arjun, if you want to approach the mike and make any comments relative to those six items or related issues, that would be fine.

DR. MAKHIJANI: Yeah, Dr. Ziemer, I also sent around a SC&A slide presentation, I believe -- must have been on August 19th or 20th, a few days after. I don't know if you have that, or if you would like to see it projected I do have it in my computer. I also have a hard copy and you can follow along with me, or we could make copies later on. I don't know what you would prefer.

DR. ZIEMER: Is this one that you were going to use tomorrow?

DR. MAKHIJANI: Yes, in case you asked me for a

presentation, I was going to use -- use that, but I could go through it now more informally if you'd like --

DR. ZIEMER: Sure.

DR. MAKHIJANI: -- or project it, as you'd prefer.

DR. ZIEMER: Let me ask the Board members, did you all get a copy of this?

DR. ROESSLER: Yes.

MS. MUNN: We've all seen it, yes.

DR. ZIEMER: Okay. I guess if you want to -- if you want to use that, we can track along. Is this available to the members of the public, as well? Do we have copies?

DR. MAKHIJANI: Not -- not yet. There will be --

DR. ZIEMER: We will have copies out here.

DR. MAKHIJANI: I didn't -- at least I didn't see copies. Well, I did send it to NIOSH.

DR. ZIEMER: I suspect LaShawn would probably have made copies. We'll -- we'll double-check to make sure there are copies available for the --

DR. WADE: Why don't you project it then, just so the public will be able to see it.

DR. ZIEMER: Do we need to set... He can just hook in directly, probably. Can you hook in right here, Arjun, or can you...

(Pause)

DR. MAKHIJANI: Am I on? Can you hear me? Well, Dr. Ziemer, I will go through the details of the -- how we prepared the report and so on. Since this is more informal thing I can go through that. So the priority issues Jim has already listed.

Our overall conclusion was that NIOSH has suggested approaches to the six areas that in principle could be applied to estimate maximum doses. And there's this proviso, as you see, that may still -- at the time -- now this is all as of August 16th when we submitted the report, and there are a couple of issues that I'll mention that came to my attention since that time, and new things that Dr. Neton mentioned today. But -- but I felt -- we felt that there still was some work to do on defensible values for critical parameters, and so some work remained to be completed. There are some parameters and correction factors that should be demonstrated to be claimant-

favorable. And for Plant 7-E, about which there was new information today in Dr. Neton's presentation, we felt the coworker bioassay database needed to be developed. And the basis -- I won't go into the basis of this. That's just a summary.

And we had some recommendations for completion of the work. As -- as you can see from the case studies that were done by NIOSH and distributed on August 4th, and there was a slightly updated version -- Jim, correct me if I'm wrong, the subsequent updated version was not much different -- it had some different ratios, but it was not materially different than what you sent me.

DR. NETON: (Off microphone) (Unintelligible) thorium air concentrations (unintelligible).

DR. MAKHIJANI: Okay. But I -- there was some work that was sent after that I did not have time to incorporate, but the -- NIOSH has suggested that the normal uranium -- if I step back, the whole problem of non-equilibrium presence of radium, thorium and so on comes in because when uranium was taken out and processed these other radionuclides, which are

much more -- which had much higher dose conversion factors so produced much higher doses, become very important. And it turns out that whenever you assign these non-equilibrium ratios of thorium, actinium, protactinium and a couple of other -- polonium, lead, you get much, much higher doses than if you assign equilibrium doses.

And one of the things that has happened in the last month, as we perceive it, is the detailed dependence on analysis of job categories has been put aside. They're now much broader -- production workers, maintenance workers, unmonitored workers, much broader categories. And NIOSH has suggested that equilibrium values, which produce lower doses, be assigned to uranium process workers. We're not in disagreement with that, but since it makes a very large difference to the dose -- I did -- I did look at the radon breath data, and radon breath was monitored for workers who were exposed to more radium in non-equilibrium concentrations, and I found that there may have been workers in metal working areas who were exposed to radium, but they may have been

roving workers. I could not establish from the raw data the meaning of all the datapoints, and I did not in all honesty go through all of the 451 pages and thousands of entries of raw data. I just did not have time to do that.

But one of the critical things is going to be how it's decided who was not exposed to non-equilibrium ratios, because if you assume equilibrium, it will be a much, much lower dose. And we -- our recommendation from SC&A would be that -- that that be assumed only with definitive evidence that workers did not go into and work in these non-equilibrium areas because it will make a very material difference.

One of the things that had not yet been done in our analysis is -- Dr. Neton presented this idea that there were areas where there was very little uranium and very little radium, and so primarily thorium dominated air concentrations and exposures. In those areas, the 95 percentile of the air concentrations has -- was not developed, at least as of August 16. I don't have -- I tried to find sort of quickly the air concentration data for those areas but

could not locate, and in the April report that we presented to you we had some analysis of how 95 percentiles are to be developed. It's not an entirely straightforward matter in those case where there are just a few measurements, and there are these air concentrations where there are only a few measurements and it makes a very significant difference how you calculate that 95 percentile. So the way NIOSH has chosen the Plant 6 95 percentile we're not in agreement with at this stage. So that number needs to be developed. And as of August 16th there needed to be some research to be completed on the values of the ratios.

We did -- I had Dr. Thorne -- just so you know, there was really a whole team of experts that looked at this. I had Dr. Thorne look at the feasibility of using radon breath data, whether it was a sensible method, whether it was technically defensible, and his memo is in your report in Attachment 8, and he did say that it was a technically defensible method. Because of the centrality of this issue, I had that memo reviewed by Joyce Lipsztein and (unintelligible), the two internal dose

experts, and they were also in agreement. So we are -- we are in agreement with NIOSH on that principle that you can use it.

At the August 4th meeting Dr. (sic) Griffon pointed out that some problems with the raw radon breath data -- as I said, I didn't go to that. Much of the data is not readable -- in electronic form, at least -- and there is a question about what to do with unanalyzed points. And one of our suggestions has been that the database needs some cleaning up. The lower values of duplicates should be eliminated. Some workers have scarce data and missing data, and how you handle that -- measurement errors, so there's some fine print cleaning up that needs to be done on radon breath data, which could take a considerable amount of work. But it appears to be -- we are in agreement with NIOSH that there doesn't appear to be any serious tampering with the data or anything like that, 'cause that was initially an issue.

All right, so this is -- this is further detail on radon breath data that I've just explained. This is the point where Dr. Neton has said some

new things today that I was not aware of until -- until today. The -- it seemed to us that -- a coworker bioassay data needs to be put forward. The air concentrations that are in the site profile Revision 1 which we have been reviewing for the past six months were clearly not an adequate basis. And just to give you a reference, the intakes calculated in the case study done and presented on August 4th are I think 100 times bigger than inferred from the early air concentration data. I have not looked at the -- had a chance to look at the air concentration data that Dr. Neton talked about today. In fact, today is the first time I heard about it. But if there are such data, clearly they would have to be compared to bioassay and some determination made about a claimant-favorable method, and we haven't had that discussion yet, obviously, because I haven't looked -- we haven't had a chance to look at the data.

The Board working group at the August 4th -- there are three issues in relation to external dose correction factors. One of them relates to the geometr-- location of the organ relative

to the location of the badge. NIOSH did some work in this area. We are in agreement with the approach and with the correction factor suggested. Dr. Behling did the expert work on that for -- for SC&A, and the -- there are two other issues of correction factors that remain. They're broader issues and the Board working group kind of deferred them to this meeting. But we did include them in our report as -- as they were in our last report of July because we don't think that Mallinckrodt dose reconstructions can really go forward unless this -- this issue is settled, and -- and Dr. Behling can address that as he is the one... But the correction factors overall will be substantially bigger than two if all three things are put together. In SC&A's estimate for lower torso organs and radium-type of photons, you'd have correction factors or six to eight. And then of course it depends on photon energy whether they're bigger or lower than other energies.

So there were some other priority areas. I sort of went over the most important things first. We agree with NIOSH about the radon

doses. We've gone over -- Dr. Anigstein had done this work and -- and Dr. Lipsztein -- a number of us, but specially Dr. Lipsztein and Dr. Anigstein have looked this over and we are in agreement with NIOSH's current approach about that.

I think we also think that the unmonitored worker approach is satisfactory.

Regarding incidents, NIOSH has said, if I'm not -- if I'm remembering the report correctly, that usually the continuous intake approach will bracket it. I think the examples do seem to demonstrate that. Just as a caution, we did not verify the numerical calculations of the case studies presented. This -- this was clearly not feasible within the time frame because a lot of this stuff came after August 4th -- like August 8th, 9th, 10th -- and it was just not possible to verify it in any sensible way. It does turn out that there are some dose conversion factors that may be wrong (unintelligible) source documents -- some source documents, I don't know which source documents, that need to be attended to. That is a point of detail that needs to be cleared

up and probably can be cleared up.
(Whereupon, Dr. Jim Melius joined the subcommittee.)
DR. MAKHIJANI: There are some incidents that may be so unusual that this may not bracket it. We did document -- afterwards I went and looked at our previous report, and when I came here to St. Louis in May -- was it, Denise? -- there was someone who mentioned an incident in the ionium processing where the stuff boiled over and was spilled on the worker, and I think this type of incident may not be adequately bracketed. It certainly needs -- unusual incidents need to be examined, but since this is a TBD review, I think overall it seems okay. But there is a caveat there for dose reconstructors I think that should not be ignored.
Routine environmental dose, NIOSH's approach is satisfactory. I think they've done -- they've demonstrated that. There is a question of accidental environmental doses. Ms. Brock did provide -- gave me a disk full of documents on August 4th in Cincinnati. I did take a look at many of them and found data from which

dispersion coefficients can actually be inferred, and that is in the report, and we think that NIOSH does need to take a look to see at least whether doses from accidents and incidents could make a difference in some cases.

And then finally NIOSH has -- we pointed out in July that NIOSH has used a Technical Information Bulletin 2 to maximum internal dose estimates, and now there's a different approach to maximum internal dose estimates that shows considerable intakes. And while we haven't done the calculations, there is some question in my and in our minds as to whether the prior maximum dose estimate is -- well, really a maximum dose estimate.

And so here this -- these are the four critical issues -- there are some issues with radon breath data, but these are the critical issues where work remains to be done, and I've given you some idea of who all worked on the report and so on. The ratios, the 95 percentile air concentration -- which I again remind you is a non -- non-trivial issue -- the external dose correction factors and the Plant 7-E data which

we have not yet examined. That's...

DR. ZIEMER: Thank you, Dr. Makhijani. Let's see if there's any questions now from Board members on the information that you've provided for us.

MR. GRIFFON: Well --

DR. ZIEMER: Oh, Mark.

MR. GRIFFON: -- I guess I'd be interested -- I think Jim mentioned two files, one -- and I think this -- this final slide sort of outlines the notes I was making of the sort of remaining major things to consider. I think we -- in the workgroup process we did come to a lot of agreement on most of the issues, but there's a couple critical points here and I -- I mean the -- you know, as -- as Arjun said, the -- the implication -- these ratios sort of end up driving a lot of things because of the dose consequences of thorium, actinium and protactinium, so I -- I would like to see -- I know this -- the air sampling data for the 7-E stuff hadn't been provided previously, so that's new to me. And -- and I -- it would be nice to see sort of the source document by which these ratios were based. Was it a couple

samples and they had an -- and -- and generated an average, or -- we -- we haven't seen that. We've talked about it -- okay. And -- and a lot -- I guess the other thing I just wanted to -- maybe a little clarification. On the radon breath data, the -- the last question I had on that, for -- earlier I had -- I had raised a question about the lost or not analyzed -- there's a number, I think it's 25 to 30 percent in the '52 to '53 -- I looked at the data, the raw data, and did a quick assessment of roughly 25 to 30 percent were lost or not analyzed. But I -- I came to a similar conclusion than NIOSH did, which is that there didn't appear to be any trend. They weren't --

DR. WADE: I have some --

MR. GRIFFON: -- they weren't skipping certain high-risk workers or anything like that. There wasn't -- wasn't like they were not monitoring -- not analyzing all the warehouse workers and analyzing all the administrative people. It wasn't anything -- didn't look like any trend like that. So it -- it may not be an issue in terms of the overall distribution and the values that he calculate.

The second issue that I -- that I raised recently was I had time to go back and look at '54/'55. I hadn't had that data before, and it wasn't only that a lot of values were illegible, as Arjun pointed out. There are some questions -- and that might be a result of scanning the documents, too, I don't know. But I also found a number of points in '54 that I could -- they were very legible on the -- on the scanned copy that did not appear in the CER database, and it -- and it was a number of the values that were greater than .7 and -- and in the scheme of things, most of the values in this database are around .1, if you look at it, so that .1 is sort of the -- probably near the geometric mean on a lot of these things, so .7 and then all the way up to as high as values of -- one value of 4 that I -- that -- that seems pretty clear in the scanned copy were not in the CER database. And all these radium intakes are generated off the CER database, so I was questioning whether the database had been validated in any way and is that going to be a -- you know, result in a problem or hold-up on using this data, or is it going to change

intakes significantly? I'm not sure I know the answers to those questions, but those are some things that I've (unintelligible) about. I think Jim's right here --

DR. ZIEMER: Jim, is that something you can respond to?

DR. NETON: Way to go, Mark, I could think about this for over a month.

MR. GRIFFON: Yeah, I was just giving you time to --

DR. NETON: That's good. You raised some -- I can't tell if this is working or not, is it?

MS. MUNN: Yeah.

DR. NETON: You've raised some really good issues, and I'm not sure which one to tackle first. I think I'll start with the HASL radon breath data.

As we talked about, there's 451 pages of data, fully agree that it's hard to read some of these images. And it's our interpretation it's a scanning problem. We actually have a team in Germantown starting yesterday that are re-scanning the entire 451 pages. And matter of fact, I expect by Wednesday or so we're going to have this whole thing re-coded.

The issue with the radon breath data are -- is that when ORAU inherited the Mancuso dataset, they did a validation of all the data they had. They did a 10 percent sampling of the radon breath data and came to the conclusion that the air rate was about three percent or something -- which was acceptable for -- for an epidemiologic study.

To do that, though, they went and polled against the original medical records. They did not use the HASL data. Once I found that out, we decided to go back and capture -- recapture the HASL data in complete format and generate the distribution from the data there.

I'll agree with you there's some -- what appear to be high values, but it turns out that analysts use different ways of recording values. A good scientist would have a 0.7 so you'd know. Many analysts would just put .7. The scan is such that those little points are not showing up, I think. That's -- it's possible it's as high as 7. I'd be surprised if there was a 7 picocurie per year --

MR. GRIFFON: No, I didn't say -- the highest I saw was 4, and would even question the fact

(unintelligible) --
DR. NETON: Even 4 sounds really, really --
MR. GRIFFON: -- and that might have been a .4, right.
DR. NETON: That's what I was saying --
MR. GRIFFON: The other ones were very clearly high values that weren't in the database.
DR. NETON: Right. We -- we can't tell from that. We're re-scanning the entire dataset. It's in the posses-- I was in the original data capture effort at EML offices in Manhattan. DOE picked up that dataset and is maintaining it now in Germantown -- Roger Anders*, Office of Worker Advocacy. We know where it is. We're there. It's -- it should -- it's probably been re-scanned by now, I don't know. So -- so we're addressing that issue. And -- and to me, that is the gold set. That is the original analytical data at HASL.
Now let's talk briefly about the missing data and what happened there.
I got in touch with Dr. Naomi Harley, who was an analyst and ran the radon breath data -- at least in the latter periods of that time -- and I asked her what -- what does a lost sample

mean. You know, what does this -- what does this mean, and why -- especially like in August of 195-- I forget which year -- there's a lot of missing data. Sorry, it actually says -- a whole sheet would be not analyzed. And her memory was clear on the analysis, not clear on real specifics, but her -- her guess was at that time that the -- the shipment problem -- they did not have Federal Express back then. These samples were shipped from Mallinckrodt to New York, and if they sat too long on one end of the loading docks, radon's got a fin-- a three-day half-life or so, it may be that those samples had just decayed too long that they couldn't be analyzed or to have any meaningful information, or it may be that the person who was the primary runner of the instrument at that time was also gearing up and being involved with fallout data collection around the country and he may have been on travel status at that point, when the samples arrived, and didn't get to them. So there's a number of issues that can explain this. That doesn't make it right, but I guess at least it points to the fact that there was no intentional

censoring or biasing of analyzing which datasets.
In fact, we went back and looked at this to some extent, and I have to rely on my slides for later, so you guys are going to have a repeat performance of some of my slides maybe later in the week. But we went back and collapsed the job categories -- I thought I'd fixed that typo in the title -- but we collapsed the job categories of radon breath data, and they fall into a pretty wide distribution, and kind of what you might expect. About 58 percent were operations folks, 13 percent trades and crafts, laboratory, warehouse, and then some administrative and miscellaneous. But it looks to me there's a fairly broad -- broad sampling. This was based on an analysis of the HASL data. Well, actually the data that were coded.
But what we did was look -- and went to that month of August where a lot were missing -- oh, this is just another breakdown of the percent of the samples by year, and so it kind of flows by year, the same distribution by year of radon breath. There's a lot of data. I mean there's

thousands of samples here. But what was more significant is we said okay, what happened with these people that were missing in August? They just didn't analyze their samples. Did they in fact have any valid radon measurements? Remember, radon breath is an indication of the amount of radium in the body, so it's a long-term indicator, much like any other bioassay that has a long half-life in the body. If you miss a sample and you get one three months later, there's really not much difference there 'cause it's a long-term deposition measurement. So to make a long story short, within one year of the 40 -- the 40 workers that we identified in that month of August that didn't have samples, 98 percent of them had a valid radon sample at least in the HASL database someplace. So we feel pretty comfortable it was not selective censoring. They went back and we have data on a routine program where we at least have one sample for -- for the people that appear to have missing information. So I think there's a pretty good story here on the radon. I agree that the missing data looks suspect, but you know, we've done everything we

can to try to answer it.

DR. MELIUS: Can you just explain, what do you mean by selective censoring?

DR. NETON: Well, I mean did they go in and throw out -- not analyze the people that were likely to be high, you know, the raffinate workers, and say we're not going to analyze those people because they were over-exposed or we don't believe the data because they're high or something like that.

DR. MELIUS: Yeah, but -- but that wouldn't rule out some other kind of selective sampling -- August was high or whatever. I mean all you can say is that the individuals weren't --

DR. NETON: But the individuals were re-sampled. I mean 98 percent of the individuals --

DR. MELIUS: Yeah, that's fine, I'm just trying to understand. I'm not trying to argue with you about it. I'm just trying to understand your conclusion there.

DR. NETON: Okay. It just appears to us to -- the people who were on the routine program have samples and they just were missing August for whatever reason.

MR. GRIFFON: I guess my -- the second part we had seen in the workgroup, too, and I -- you know, I did a similar sort of look at that data by job and things, and I get that general conclusion, as well. The first part I have a little more heartburn with --

DR. NETON: What's that?

MR. GRIFFON: -- which is the CER database potentially missing elevated values and --

DR. NETON: Yeah, yeah, and we're going to re-code based on the HASL data, the original data itself.

MR. GRIFFON: And there's another item in there which -- you know, just from the validation standpoint, it's clear many times in the raw data that -- that something was labeled a re-sample -- or, I'm sorry, a repeat. Not a re-sample, but a repeat. And in some cases they put it in the database in a second column and in some cases they put a whole new sample line in. So there's -- there's some questions on the -- you know, the quality of that database for individual dose reconstructions, anyway. I mean --

DR. NETON: Right, I'll grant you that. So I

think -- I think that's about all I can say about radon breath. I think we're recapturing it. We've got the original 5,000 samples or whatever there were and we're going back and putting those issues to bed, I hope.

Now the other issue you brought up, Mark, was -- well, the ratios, the raffinate ratios. And we passed out a sheet -- I apologize for some of the preliminary nature of these things, but this is real-time science. Essentially what we're doing is developing a workbook here. You've all talked about site profiles and we have the Mallinckrodt site profile. We're -- we've been developing the workbook to do these individual cases on the fly, so to speak, in a -- you know, in real time.

What you see here is a summary, and there aren't many samples to quantify the amount of thorium -- there aren't many references. We've listed the references here. There's actually one on here that we just got that's even a little more recent, an Argonne Laboratory analysis, but basically what we end up having is a couple of references that put the -- put the airport cake thorium in the low tenths of a

part per million range, which equates to about 70,000 picocuries per -- per gram of material -- pretty high material. In fact, it's almost the same -- the thorium 230 content of the airport cake is about the same concentration as in the K-65 material, which kind of surprised me. You wouldn't think a process would split selectively like that and go fifty-fif-- well, I don't know if it's fifty-fifty or not because the mass of concentra-- the masses could vary, depending on additives during the process. But nonetheless, it's about 70,000 picocuries per gram. I think we feel fairly comfortable it's in that range.

What we were having more difficulty with is the protactinium content. The sample that we chose to use for the protactinium analysis was a couple of analyses that were done of the Sperry cake itself. Now Sperry cake was identified early on as a very good source of protactinium. In fact they selectively used Sperry cake to isolate protactinium because it was such a good source.

We are assuming that the protactinium content of the AM-7, the airport cake material, is

equal to the protactinium concentration of the Sperry cake itself. We believe that to be a fairly sufficiently bounding calculation. If you do that, you end up with about a 15 percent of the alpha activity in the air is going to be related to protactinium 231 and about 85 percent related to thorium 230. Actinium 227 itself is not an alpha emitter -- it has a lot of daughters that are -- so that doesn't come into the mix, but we're assuming 100 percent equilibrium with actinium 227.

So that -- that results in some fairly high doses, and I think what I'd like to show is something that's fairly interesting as a result of the example cases that we've done. And let me pull up what we call Case 1-2, which is the dose reconstruction example for a person who --

MR. GRIFFON: Jim --

DR. NETON: Yes?

MR. GRIFFON: -- before you go into that, you don't have any spreadsheet that -- that will show me this stuff in similar units? I mean this is a -- this is -- it's sort of difficult to get a sense of an average value when you have -- I don't even know for the first one,

two grams of protactinium for 20 tons of cake --

DR. NETON: Well, that wasn't used in the calculation, I can tell you that.

MR. GRIFFON: Okay.

DR. NETON: If you read all the way through it, it will tell you which values were ended up -- we ended up using.

MR. GRIFFON: Okay.

DR. NETON: It's only a couple of analyses, but --

MR. GRIFFON: I'll hold on.

DR. NETON: -- I can get that to you.

MR. GRIFFON: I would like that.

DR. NETON: But let me show you something I think is of significance here. This is the case where we had a worker -- a -- these are -- as a matter of fact, this only applies, by the way, to residue raffinate workers at Mallinckrodt, which is going to be a large percentage, based on, you know, how we ended up realizing that workers shared a lot of jobs. But this person we assumed had no radon breath, even though he did, and did the analysis as if we had to use the thorium -- the 95th

percentile of the time-weighted average of the air concentrations in Plant 6. That ends up to be about 607 disintegrations per minute per cubic meter, roughly about 8 or 9 times the maximum allowable concentration at the time. By the way, these are not several samples. For instance, in 1950 when they did an air dust study in Plant 6, they went and collected 500, 600 samples, and then they collapsed those samples into a distribution of workers -- they had job occupations, so they used all -- this is all the (unintelligible) for 600 samples and came up with a time-weighted average for about 30 or 40 different occupations within Plant 6. It seems to me that that's the best way to figure out what the 95th percentile worker is exposed to. Otherwise, if you used a -- you know, the data -- the raw data in itself, then you run into the situation that SC&A has rightfully criticized NIOSH for doing sometimes is how do you know that those samples are representative of the whole distribution? How do you know that they didn't go and selectively pull more samples in administrative areas versus production areas? This is

representative of the 403 workers in 1950. But let me -- nevertheless, we used the 9 MAC air or whatever it was and came up -- this ratio's a little different than what you have, so the doses will actually even be higher. We used a ratio of about 12 percent protactinium to thorium 230.

But what I want to point out here is the doses. If you look at the dose to what I would consider the non-metabolic -- what we consider the non-metabolic organs -- and this would be here, and that would include things like prostate and pancreas and all those kind of organs, the organs that do not specifically concentrate the thorium -- or the protactinium or actinium -- almost all the dose is driven by thorium 230. I mean there's some from the uranium, but I think 95-plus percent of the dose for a non-metabolic organ is driven by the thorium 230. So in some respects, the protactinium/actinium ratios are almost irrelevant for this calculation. In fact, it's better to assume all thorium 230 for those organs. And in fact, I would suggest that we may want to do that because we don't know these

ratios perfectly. It's accepted that it's 15 percent or so, in that ball park -- and that's a high -- if we use 15 percent and we assume that's a high estimate, which we believe it is because it's based on Sperry cake, then we would probably be lowering this dose by putting more actinium and protactinium into these non-metabolic organs. So for those situations it would seem to be appropriate just to use thorium 230, assume all the air concentrations, use thorium 230.

What you end up with -- and there's only several organs that concentrate actinium/protactinium. Clearly actinium 227 is the heavy hitter in the liver, the bone surfaces. We don't have it shown here, but it would also be similar for red bone marrow and the gonads, the testes and the ovaries. Those are the only organs where actinium really produces doses, and you can see that these doses are huge. I mean we're talking 30,000 rem to the bone surfaces from just that intake. So for those organs I think it's claimant-favorable to take that 15 percent -- and they're going to be even higher than this now

if we use 15 versus 12 -- and apply them to the non-metabolics.

The issue that Arjun alluded to here was the surprising low value here in the liver for protactinium 231. Our ICRP documents and IMBA come up with -- shows that this is not too unreasonable. Arjun has access to a FRG-13 (sic) report that says there should be closer unity. I'm not sure which is right. All I know is we've used ICRP. It needs to get to the bottom of the issue. That would only, though, tend to drive these doses even higher, if the protactinium were closer in unity, so these metabolic organs would even go -- go higher, even though they're already fairly high.

In fact, if you look -- well, we didn't even bother with the PC calculation here because these are all well over 50 percent, and in the kidneys, as well. The kidneys, interestingly, are driven by thorium, as well. So again, the liver, bone surfaces, red bone marrow and -- and gonads are metabolically active, but particularly for actinium, possibly protactinium, and that's what drives those --

those doses.
Although I might add that the thorium doses are not trivial. In fact, these doses alone -- the thorium intakes alone would -- would more than likely make this case compensable without any actinium or protactinium. So I just want to point that out.
Okay, so I think I've talked a little bit about the ratios. I'm not sure what else there -- did you -- what other -- what other issues did you bring up, Mark, that --
MR. GRIFFON: Just the -- the new thorium air data for the --
DR. NETON: Right. Right, thank you. As I indicated, there was a couple campaigns for thorium, and this is a fairly busy spreadsheet but you can see we have samples identified by pretty good job description -- good location here, covering a wide range of years -- somewhere on here I have the year. But I think the most significant thing to point out is this is the fit to the couple of hundred datapoints. You get a nice lognormal fit to the distribution. R-square is .99, so you get a reasonable fit, and these are for that second

campaign in '56 and '57. These samples were collected -- and I don't have the dates handy here, but they were over that '56/'67 time frame. I'm not sure where the dates went on here.

So we have these data for the second campaign. And the first campaign, I don't have the bioassay samples here, but we have 70 bioassay samples that were -- that were taken on workers during the fir-- what I call the first thorium/ionium campaign.

So I apologize. This is fairly late-breaking information, but I thought it was important to throw it out here, you know, when we get it. This of course would only affect workers who worked on that ionium project in Plant 7-E for the campaigns. And we have workers who -- we have cases that do have Plant 7 -- 7-E indicated in their work history.

I'm trying to see where -- oh, here's the dates. Sorry. The dates are there now. You can see '56, '57 -- and clearly we're going through trying to figure out what the -- what the airborne was in the plant during that time period.

MR. GRIFFON: Jim, do you have -- could you provide us with that electronically and --

DR. NETON: Sure.

MR. GRIFFON: -- and the -- you said you have something else that might have the same units for those fractions that --

DR. NETON: Yeah, I can send electronically a spreadsheet that actually is the basis for that.

MR. GRIFFON: That's what I'd like to see. Thank you.

DR. NETON: Yeah, it's a -- you know, it may take a little work to decipher. It's not prettied-up for public consumption necessarily, but you should be able to figure it out.

DR. ROESSLER: I might have kind of forgotten -- can I talk? In the previous slide where you had the table with the various radionuclides on it, and then you said something about NIOSH is using ICRP data, and then you said Arjun has access to something else. What was that?

DR. NETON: FRG-13 -- FGR-13, Federal Guidance Report 13.

DR. ROESSLER: FRG-13 (sic).

DR. NETON: Which is -- you know, it should be

the same values.

DR. ROESSLER: I would think you could track that back, because --

DR. NETON: We're going to.

DR. ROESSLER: Yeah.

DR. NETON: We've got Keith Eckerman's ICRP, whatever number it was, and Arjun's got the Federal Guidance, and -- but what's interesting is our values that IMBA calculated tend to agree with the ICRP. The Federal Guidance Report seems to be up, but it doesn't mean that ICRP doesn't have a mistake and was annotated later but been fixed, we just don't know. And those are only 50-year doses.

DR. ZIEMER: Arjun has a comment.

DR. MAKHIJANI: This is actually, in light of what Jim just said, more than a point of figuring out which official reference is correct. Because for instance, in regard to the breast, the -- in Federal Guidance Report, leaving the liver aside where the discrepancy is orders of magnitude, and there's something wrong somewhere in some official publication -- but if you look at other organs and compare protactinium and thorium, the dose conversion

factor -- committed 50 years, admittedly -- for the breast is four times bigger for protactinium than it is for thorium. So I -- I'm not sure -- some -- somehow I think these discrepancies in what radionuclides are important really does need to be cleared up because it will go to your assumption that thorium is the most important radionuclide because if the Federal Guidance Report dose conversion factors are correct, then you're going to have to revisit the question of whether protactinium is more important or thorium is more important. And at this stage, I just -- I don't know which is right.

DR. NETON: Right. I looked at all the organs that we have modeled, and I didn't -- unless I missed it, I didn't see breast be higher, but it's possible. I mean I don't know.

DR. MAKHIJANI: Yeah, I'm just making a statement of what is in the Federal Guidance Report 13, which is supposed to be from ICRP-68, I think. I just checked up the numbers, and -- just to try to understand your results in a quick, back-of-the-envelope way, and I couldn't quite understand them exactly.

DR. NETON: Well, I think -- I think the point is, though, that -- you know, the -- the organs that have metabolically been modeled as concentrating actinium or protactinium are going to clearly have much higher doses. The doses that are considered the remainder, which is all other soft tissue, are going to be driven by thorium 230. There just -- that's just a fact, because there is no sync/sink* for those organs -- for the -- in those organs for actinium or protactinium. I don't know what the metabolic model is, in my head, for protactinium versus actinium. The other issue is, actinium -- even if they have the same metabolic model -- is going to deliver five times the dose per unit intake because it's got a string of very short-lived alpha-emitting daughters that -- that grow in fairly rapidly, very easily within the first year or two of exposure. And that's why the actinium doesn't surprise me as being high.

Now being that far off, I don't know. We do need to get to the bottom of it. I totally agree on that.

DR. ZIEMER: Thank you, Jim. Board members,

other questions at this point? Mark, did you have another one? You look a little restless.

MR. GRIFFON: (Off microphone) (Unintelligible) stumbling around (unintelligible).

You know, I guess -- I mean it -- it just dawns on me in some of this, the path we've taken -- and I know a lot of work has gone into all this -- but what -- what's striking, and I think people -- maybe everybody realizes this, but the part that's driving the doses and the POC in this whole thing is the part that we know the least about, and we have the least data for. You haven't heard much about uranium urinalysis lately. That's because we've gone away from -- you know, all that tons of data that we have, it's not really being used anymore because, like Jim said, the dose is being driven by these other -- other isotopes. It's important to remember that there's no personal data -- well, there -- there is the radon breath data, but there's no personal data for the thorium, actinium, protactinium, except for that one small sector. Am I wrong on that or...

DR. NETON: Right, we have ionium data for

about 70 workers.

MR. GRIFFON: For two months.

DR. NETON: Yeah.

MR. GRIFFON: But -- so I mean, you've got -- that -- that's why everything comes down to the importance of these fractions and where they came from and who they're going to apply to. And I think -- and I've been involved throughout this process, and I'm still a little bit unclear on who, where, when. And I think your intention is to be favorable, given -- whether radon breath or thorium -- you use the higher of the two derived values. But is it -- and I think what I heard, maybe I'm wrong, is that short of a very clear work history that says that they weren't in Plant 6, you'll assume they were a residue worker. Is that --

DR. NETON: Absolutely. Yeah, I mean I totally agree with SC&A's position on this, that lacking evidence to the contrary, we're going to assume that these people were raffinate residue workers in Plant 6. And as far as the 95th percentile, I think if you look at it, assigning the 95th percentile of the radon breath data to a worker will usually result in

higher doses than using the 95th percentile of the air data. I can't say across the board, but it's almost a certainty that most of the time it's going to be higher. And then if you apply the -- a distribution of the values to the people who were not considered to be raffinate residue workers, but just in the vicinity of the area, is also a claimant-favorable approach I think.

'Cause you've got to remember, I think these -- these thorium values we're talking -- this was a wet process. This is not like they're manufacturing thorium metal here. This is a wet process until you get to the -- to the end where you generate the cakes. And admittedly there was a large amount of that, but this was not manufactured, ground -- you know -- I mean so you can get air concentrations, don't get me wrong. But I think to assign the full air concentration, as we're doing, to either thorium 230 or the actinium is a fairly claimant-favorable approach. And you can't discount the thousands of air samples we have, Mark. I mean I think you're right.

MR. GRIFFON: No, I know. I guess -- I guess

the other -- to -- to go on your point, I guess the other interesting observation in all this is the case -- the case comparison, when you look at somebody who have radon breath data versus the person who didn't have radon breath and use the coworker model assuming the 95th percentile, that individual gets quite a bit -- I forget the numbers, but quite a bit higher dose assigned overall. So --

DR. NETON: That's part and parcel of this program. Unmonitored workers where you're claimant favorable, and you don't know, get higher -- that's not unique to Mallinckrodt.

MR. GRIFFON: I underst-- I'm just pointing that out. That's a --

DR. NETON: I mean I don't know how you get out of that box. I mean if you want to be claimant favorable and you don't know -- but again, you're going to -- you're not going to be just stuck with using the radon breath data because then you're also going to do the 95th percentile of the air data and compare the two, and that's going to drive you into the situation where you've got the high -- high thorium intakes that are going to drive you to

some pretty high values.

DR. ZIEMER: Additional questions or comments?

(No responses)

Now we will have extensive time again later in the meeting for discussion of the Mallinckrodt petition and the materials here. One of the questions for the subcommittee was whether or not the subcommittee wishes to raise any further questions for the Board to consider, or any -- to make any recommendations for the Board to consider relative to any follow-up on this, additional questions or information that we identify.

Yes, Jim?

DR. MELIUS: I actually just have a follow-up question for Jim. You don't need to get up, I don't think, but are you planning on handing out anything else new in terms of documentation or something? 'Cause it'd be better to have it now than wait until --

DR. NETON: I understand.

DR. MELIUS: -- if it's ready now.

DR. NETON: No. No, I don't really have anything else to offer other than maybe electronic spreadsheets that Mark has

requested.

DR. MELIUS: Okay, thanks.

DR. ZIEMER: Wanda?

MS. MUNN: In response to your direct question, Dr. Ziemer, from my perspective, NIOSH and SC&A have fulfilled our request for additional information and I feel that we've taken this issue as far as it needs to be taken. I am hoping that the subcommittee will recommend that we remove the tabled item and consider it at this meeting this week.

DR. ZIEMER: It certainly is in order if you want to recommend that the subcommittee make that recommendation. The subcommittee cannot un-table the motion, but we can make a recommendation to that effect, if you so wish. Are you making such a motion?

MS. MUNN: That was my hope, that the subcommittee would provide that recommendation to the full Board.

DR. ZIEMER: I'll interpret that as a motion. Wanda has made a motion that the subcommittee recommend that the Board remove from the table the previous -- previously-tabled action for consideration. Is there a second to that

motion? This is not a motion to un-table, it's a motion to recommend that the Board take the motion from the table and consider it. Is there a second?

MR. PRESLEY: Second. Does it have to come from a committee member?

DR. ZIEMER: We're all members of the subcommittee.

MR. PRESLEY: I'll second it.

DR. ZIEMER: Any discussion on that motion? Jim?

DR. MELIUS: I believe, from the agenda, we're going to be considering the issue of the Mallinckrodt Special Exposure Cohort on Friday morning. And again, I may have missed some of the discussion that's gone on here, but I think a motion to do with the -- Wanda's motion that was tabled at our last meeting would be more appropriate in the context of the full Board meeting. I'm not sure what we gain or lose or -- from having a recommendation from the subcommittee. I think we're all assuming it's on the agenda. Let's deal with it in the context of the NIOSH presentation on the petition and then, you know, presentation of

what work's been done by our contractor and so forth.

DR. ZIEMER: I might comment if this motion passes it still requires a motion at the Board meeting to take it from the table, yes. Denise, did you have a question or comment? I'll recognize you --

MS. BROCK: I do. Is it all right if I --

DR. ZIEMER: You bet.

MS. BROCK: -- ask something? I was just curious about the external dose conversion factors. Can that be addressed now? I'm --

DR. ZIEMER: Sure.

MS. BROCK: -- very curious about that.

DR. ZIEMER: Yes.

DR. WADE: Just for the record, I mean the petitioner's been involved throughout this working group process so I think it's most appropriate that she has an opportunity to speak as she likes.

MR. GRIFFON: Yeah, I was actually going to ask, once we moved past this, that we do the procedures review. And one of the first items we should consider is the dose conversion factors.

DR. ZIEMER: Right. Right. Let me ask if there are any -- anyone wish to speak for or against this motion?

DR. MELIUS: I guess I was speaking against the motion in my --

DR. ZIEMER: Okay.

MS. MUNN: Perhaps my understanding was erroneous. It had been my understanding that one of the reasons the original motion was tabled at the full Board was so that the subcommittee could pursue with SC&A and NIOSH the resolution of these specific issues that we had requested. Because that was my understanding, I was then wishing to make very clear that the subcommittee was accepting of the information and the work that had been done since that past meeting and was ready to have the full Board consider this again.

DR. ZIEMER: So the context of the motion is with respect to the completion of the addressing of the six issues.

MS. MUNN: Yes.

DR. ZIEMER: Additional discussion?

(No responses)

Let me call for a vote now, so if you vote yes,

you're simply recommending that the issue at the -- recommending to the full Board that the issue of the motion on the petition be removed from the table and considered in the full Board meeting. Again, this motion is not binding on the Board in any event. It still would require an actual motion to remove from the table.

Okay, all in favor of this motion, say aye.

(Affirmative responses)

Okay, let me get a show of hands -- one, two, three, and the Chair will vote for it, that's four.

Those not favoring the motion, say -- raise your hand. Let's see, one, two, three, four.

In essence the motion fails for lack of a majority. One of the awkward things about the way we operate with the subcommittee is that since all members are members of the subcommittee, we don't have a defined number to work from, which is a problem we may have to address in the future.

So -- now it may -- it may be harder to have a motion, if the -- if the subcommittee so feels, that is more the nature of your preliminary comments, that -- that the subcommittee

believes that NIOSH and our contractor have addressed the six issues appropriately. This doesn't necessarily mean that every point has been brought to closure, but unless there are additional things we want to send them back to do, it may be appropriate to make some motion along those lines.

DR. MELIUS: Can I just -- I'm a little confused because I -- as I recall, when we originally established the working group, we weren't contemplating a subcommittee meeting. So it was really after the fact that we suddenly decided that the workgroup reports to the subcommittee and then reports to the committee. And I'm -- I don't think -- I don't think this materially changes anything we're going to be doing in our full Board meeting, but it is a little --

DR. ZIEMER: It does not. It simply gives this subcommittee an opportunity, if you so wish. You -- they were under no obligation to take any action.

DR. MELIUS: Yeah, and may I also say that the working group really -- I don't think it was charged with coming up with a report. I mean

if we were going to sort of do something to accept a report -- the subcommittee accepting a report from the workgroup, then -- then maybe this sort of procedure's appropriate. But it seems to me that -- seems that we're spending a lot of time on something that I -- I don't think it's going to change materially what we do at the meetings the next two days, so I guess that's my concern.

DR. ZIEMER: That certainly is correct. Again, I'd simply point out that if the subcommittee wishes to go on record, you can -- you have that opportunity to do so.

There appears to be hesitation on the part of the subcommittee to take a formal action on this. Let me ask if you have any additional issues or comments, and then we'll go on with the next item, if we don't, relating to the Mallinckrodt petition or -- and more precisely the review that we have been looking at.

(No responses)

Okay. If not, we have two other items -- let me check our clock here first to see where we are. We're at 2:40. We need a comfort break?

MS. MUNN: Yes.

DR. ZIEMER: Comfort break, 15 minutes, and we'll reconvene.

(Whereupon, a recess was taken from 2:40 p.m. to 3:05 p.m.)

DR. ZIEMER: Time to reconvene. Just prior to the break we had a question raised by the petitioner, Denise Brock, about the dose conversion factors. And this might be an appropriate time for us to address one other item that we spoke about this morning. It's not just dose conversion factors, but in fact generically the issue of the procedures review, of which the dose conversion factors were a portion.

Let's see, I guess before I do that, Denise, I believe you said you had an additional comment and I'd like to give you the floor if you'd like to make that now.

MS. BROCK: (Off microphone) (Unintelligible)

DR. ZIEMER: Oh, okay, we'll -- we'll catch you later. Thank you.

TASK III REPORT

So the kind of generic issue that we need to consider is the issue of what the Board would like to do with the task three report. We have

a report from our contractor, which is the summary of the procedures review. We've had that report for some time. It contains a number of findings. Earlier in the week Board members were sent an e-mail copy of a matrix showing all the findings. There are copies available here, also, on the table if you didn't get that in your e-mail.

MR. GRIFFON: It's a -- a --

DR. ZIEMER: It's called Summary of Task Three Procedure Findings Matrix.

MR. GRIFFON: I should say it's a -- a partial listing. Kathy's still working on it, but -- so this is a partial listing of what's in the full report.

DR. ZIEMER: May have some additional items, but it captures a lot of what's in --

MR. GRIFFON: Yeah.

DR. ZIEMER: -- in there, and basically it's a findings matrix, which is somewhat analogous to what -- the matrices that we've developed on other reports. It has the NIOSH procedure number -- or maybe an ORAU procedure number, I think, in many cases. It has a finding number and a description of the finding and the

location of where that occurs in the SC&A report. As she developed her matrix, in anticipation of perhaps how the Board might proceed, there's a -- currently a column designated "NIOSH response", and you'll notice there's nothing there because we've not asked NIOSH to respond to this report, but we may wish to.

Now in connection with that report, if you look on the second page, starting with Finding Number IG001-09, 09 and 10, and really 12, 13 and 14, I believe. Those five at least have to do with dose conversion factors of one type or another. And I think for -- for the -- our immediate needs as far as the Board's concerned, we may want to ask the question, for the Mallinckrodt site profile what issues come out of this? That is, what are the dose conversion factors that would be used. And of course generically you have these questions in terms of the procedures in general, across the board.

It would seem to be appropriate to ask -- to raise the dose conversion factor with respect to Mallinckrodt. Now Jim, you talked a little

bit about that earlier today, did you not, in...

DR. NETON: I just addressed the issue that was raised regarding the exposure geometries at Mallinckrodt, and we -- I think we're in agreement that the factor of 2.1 is appropriate.

There's a second separate issue that was raised related to the dose conversion factors in the implementation guide and their application generically. I mean it certainly applies at Mallinckrodt, but it would apply to every single site that we're doing dose reconstruction -- where we're doing dose reconstructions and so it's the applicability of the -- and -- and the angle of the incidents of the radiation. And also I believe SC&A raised some issues where they do environmental effects on dosimeters and how that's accounted for, and we have not addressed that at this point.

DR. ZIEMER: Now as far as Mallinckrodt is concerned, what questions are still open as far as dose conversion factors -- in SCA's mind? Let's see, where's Arjun? Is Arjun here?

Arjun, we're talking about dose conversion factors. And specifically in the Mallinckrodt case, what are the open issues in your mind on dose conversion factors as far as Mallinckrodt specifically is concerned?

DR. MAKHIJANI: Yes, the two open issues are the generic issues, and I think Hans would be better to address them. He knows -- he wrote the memo. It's in Attachment 8/A*. The one issue relates to the angle of incidents on the badge because you have the shielding, and when it's incident at other than normal, it goes through a greater depth of shielding and so there's an attenuation there. And other -- second issue is the dose conversion factor, mostly in geometries other than AP. But I think Hans is the person who developed the issue -- these two issues, and since they are multiplicative, it makes a fair amount of (unintelligible).

DR. ZIEMER: So in case of this matrix here, it's item 12 and 13 then, the geometry issue, and perhaps rotational and isotropic geometry. Basically it's the angular issues and geometrical issues. Okay.

DR. MAKHIJANI: Yes, Dr. Ziemer, that's right. And in the table -- there's a summary table in the report, the third supplemental review, in the summary table under external dose, I think it's item three dash --

DR. ZIEMER: In the procedures review or in --

DR. MAKHIJANI: No, in -- in the Mallinckrodt report --

DR. ZIEMER: Oh, in the Mallinckrodt report.

DR. MAKHIJANI: -- that you have.

DR. ZIEMER: Right.

DR. MAKHIJANI: They are listed as items 3-2 and 3-3 in the summary report, I believe.

DR. ZIEMER: Okay.

DR. MAKHIJANI: It's -- it's close to the front of the report, in that big table.

DR. ZIEMER: Yes, I found it -- 3-2, angle of incidents to badge for deep dose and 3-3 is AP, PA and rotational isotopic geometry.

MR. GRIFFON: So those look like 13 and 14 on our -- on our procedures review spreadsheet.

DR. ZIEMER: Yes, that's correct.

MS. MUNN: Yes.

DR. ZIEMER: Well, and then there also is an external deep dose conversion factor that has

been identified here, as well, in the Mallinckrodt report.

MR. GRIFFON: Is that the 2.1 -- that's the factor --

DR. MAKHIJANI: That's -- the 3-1 part of it I think has been addressed by the Attila modeling by NIOSH and -- and we are in agreement with that.

DR. ZIEMER: Which one is that?

DR. MAKHIJANI: The 3-1 in the third supplemental Mallinckrodt --

DR. ZIEMER: Oh, organ versus badge?

DR. MAKHIJANI: Yes.

DR. ZIEMER: Yeah.

DR. MAKHIJANI: Organ versus badge, we believe NIOSH has addressed.

DR. ZIEMER: Oh, okay, right. So on 3-2 and 3-3, that remains to be -- our -- I'm trying to get a determination of whether we are in disagreement or if that's just going to be followed up. Where --

MR. GRIFFON: Disagreement.

DR. MAKHIJANI: I don't believe that the -- that NIOSH has addressed it, at least in the context of Mallinckrodt. I think -- Hans,

would you...

DR. NETON: Could I just say something for --

DR. ZIEMER: Jim, yeah.

DR. NETON: I just think -- the confusion I think exists is what the Board has identified as priority issues, and I think NIOSH has gone off and addressed the priority issues, of which in the external arena was the organ dose versus the badge reading.

DR. ZIEMER: Right, right.

DR. NETON: Now the other two issues that remain are generic issues that were raised in a task three review, and those are complex-wide issues. They --

DR. ZIEMER: Right.

DR. NETON: -- are not unique to Mallinckrodt.

DR. ZIEMER: Right.

DR. NETON: I'm not suggesting they don't need to be addressed, I'm just saying that it's not a Mallinckrodt-unique situation related to an SEC evaluation, in my mind.

DR. ZIEMER: Right. Okay. Thank you, Jim. Yes, Denise.

MS. BROCK: With all due respect to Dr. Neton, it may be generic, but we are addressing

Mallinckrodt on my petition this week, and until a bow is tied completely around this thing and these things have been addressed, each and every one of them, then we have a situation here that's going to create a lot of problems. I need to know exactly how you plan on doing this, and I need to know that right away -- not later, not years from now, right away.

DR. ZIEMER: Okay. Thank you. Jim, additional comment? Yeah.

DR. NETON: Denise is concerned, in the case of Mallinckrodt, dose reconstructions have not used -- for badged workers -- the dose conversion factors for anything other than the AP geometry, so we -- we agree, we've looked at SC&A's issue related to the dose conversion factor for rotational. It needs some work. It's based in ICRP-74 -- I think the values are correct. The application of those values -- certainly there's room for inappropriate use of those values and they could be wrong if applied exactly as written in the profile, that's true. But we're not proposing to use rotational geometry, we're proposing to use AP geometry

for these dose reconstructions. So I think that -- that eliminates the dose conversion factor issue, I think.

Now angle of incidents is a different issue. When we were working on that, the angle of incidents does vary, it's -- actually as a function of angle and also as a function of energy. We have seen the 1959 reference by SC&A, the Hines and Brownell -- well, we haven't seen it yet. We've heard what they said. We've been trying to get a copy and they're going to send us I think the relevant pages, but we've evaluated other data by Fix and others that we believe that the effect that's portrayed is not as severe as indicated in the review comments, to the point where, for high energy photons, the film badge respond almost the same as a parallel normal incident beam even at 90 degrees.

MR. GRIFFON: Paul?

DR. ZIEMER: Yes, Mark.

MR. GRIFFON: Jim, I'm just cur-- and I mean this would be good to hear -- hear, but you're -- you're confirming now that you'll only use AP geometry for these? 'Cause I'm looking on

the revised site profile, 2-A that we just got --

DR. NETON: Yeah.

MR. GRIFFON: -- and there's table 18 which gives all these different jobs and different geometry percentages that --

DR. NETON: Right, yeah. That's -- you know, we were trying to -- trying to clean that up. The -- it's been our policy -- not our policy. It's been our -- our way of doing business very much in the recent times, even before this, that the AP geometry was pretty consistently used. When we drafted this implementation guide, we envisioned rotational isotropic -- in reality it turns out that it's very difficult to position someone in time and space in the workplace and know that with any certainty -- it just was not a defensible calculation we believed we could do. So we've been defaulting for -- for the most part. Some of the earlier dose reconstructions I think you will find rotational, and we're going to address that. But it's AP geometry we believe -- with some caveats. I mean AP geometry, after our analysis, might not end up being the most

claimant-favorable geometry. We're in the middle of this analysis. It turns out that a rotational geometry -- believe it or not, it may end up being a little higher, but it's not a factor of -- you know, it's within a factor of two, I believe, but I'm quoting very preliminary results.

DR. ZIEMER: Thank you. Hans.

DR. BEHLING: Yeah, just for the benefit of the Board, I just need to make you understand what the issue is. The dose conversion factors that are cited here are technically correct, but misrepresented for the application that's being used here. If -- and I was just talking to Jim during the break.

If this was a room that was a radiologically-controlled area, and we had sources -- either a surface area -- infinite surface area or even an immersion exposure which is totally then isotropic, those values would be correct if -- in other words, if I came in here and I said to a worker, I'm not going to badge you but I'm going to measure the actual radiation field. And I would take a victorine-R* chamber and measure a air dose in R and measure that and

then say go ahead in. I know what my air dose is and I know I'm going to send you in there for eight hours. I could then use these DCFs, based on an R measurement, and they would be perfectly correct.

The truth is, what we're looking at here is a measurement that was done by film or TLD that is taken with the presence of a body. It's no longer an air dose. What you're measuring is now a dose that is measured by my film or TLD, and if this is -- if this radiation field was all around me, part of that radiation has to traverse my body. It's no longer an R dose. Moreover, the badge has a filter on it that's 10 millimeter -- or one millimeter silver, and that already measures a deep dose, so we're not talking about an R dose value that gets converted to a kerma dose that gets converted to an organ dose using ICRP-74. We're dealing with a starting point that's cons-- totally different from the starting point that's being used to derive these DCFs, and that's the -- that's the center stage issue that makes me believe that we're underestimating the organ dose if we use an R value and then convert it

to a kerma and using ICRP-74. The only time those values would be correct -- it would be for those individuals who were not monitored but we had an air monitoring measurement. In other words, an R02 or some other instrument was used as a surrogate, then those values would be correct, but not using a film or TLD. And if you look at the 30 to 250 keV photon range and you look at most of the organ doses, whether it's the female breast, the eyes, the thyroid, male testes, so forth, very surficial tissue, the -- the dose conversion values for -- PA geometry is of course the -- the worst of it because it is -- makes an assumption that the dosimeter is really on the backside as opposed to here. All the surficial tissues that -- that are on the anterior side would really only be approximated by an AP geometry DCF. All the other ones would be off by at least a factor of two, and that's my conclusion.

And so when Arjun earlier talked about an effective value of six to eight, that really was the multiplicative (unintelligible) of three independent measurements. In other

words, the 2.1 which says I'm wearing my TLD here but I have organ doses that are below the level here that are much closer to the close, and that's the 2.1. Another potential value of two is the issue of DCF that I just discussed. And thirdly, possibly the issue of angle of dependence, because all film dosimeters and TLDs are always calibrated with the face of the film or the TLD normal to a single source mono-energetic beam. The minute I start to rotate it, that same exposure translates to a much lower response on a part of the film or the TLD. And if you were to integrate the reduced efficiency by which your dosimeter responds to an incident beam of photons as I rotate it, you would probably come up with a potential correction factor of about two, and that would approximate an isotropic source, basically a summation of angle of dependence that deviates from normal. And so you have two times two times two, which possibly may result in an underestimate of a factor of eight.

DR. ZIEMER: Okay. Additional comments, Jim? Well, while you're coming up there, let me -- do we know, in Mallinckrodt's case -- because

many film badges are actually calibrated with phantoms, not in air, anyway. Do we know in Mallinckrodt's case how the badges were actually calibrated?

DR. NETON: Yes, I think --

DR. ZIEMER: Were they using a commercial service or --

DR. NETON: You know, I don't recall right now. I didn't -- you know, I haven't looked at that recently, but we have and we've discussed the calibration of the badges I think in previous workgroup meetings. We believe that we've accurately portrayed the HP10 dose. I think that's not an issue. I think we've -- we've got an HP10 dose. I think where Hans is -- I take a little exception to what Hans said is that Hans is thinking in terms of radiation protection quantities. HP10 is -- is, pure and simple, a radiation protection construct to make sure that workers are not exposed -- their individual organs are not exposed above a certain level.

What the ICRP-74 has done is taken and allowed an HP10 reading to be inferred as to what the actual organ dose is. For example, the breast.

It -- I would argue that the dose at one centimeter in the breast is equal to the deep dose, which is equal to the breast dose. If you look in ICRP-74, it's actually about .8 something because they actually modeled -- they've taken air kerma, the dose to the actual organs themselves, so that's -- that's the subtle difference there.

The issue of dose conversion factors, I agree with Hans. The values in our tables certainly need to -- need to be adjusted to represent a more appropriate application what they were intended for for rotational and PA. I think, for the record, we've never done a dose reconstruction using the PA dose conversion factor. I think it's just not -- we don't have any workers who had badges on their backs while they were being monitored or anyone that has been exposed univ-- you know, unilaterally to a PA geometry.

So I believe that the ICRP-74 calculations are correct and you need to go to air kerma to come up with individual organ doses themselves.

And the issue is a little more complicated than Hans I think is indicating because you have two

competing things going on here. As the -- as the geometry changes and the energy goes down, yes, the badge is reading less dose than is really measured. But at the same time, the individual organs themselves are receiving less dose because of the -- of the particular geometry, and it's very difficult to project based on -- first -- I mean you just can't project what -- how the effect is going to be, so you know, if you have 30 keV and the badge under-responds by a factor of three, that may be true, but then the organ dose itself may be lower by a factor of three -- and we've seen this quite often, that there's competing -- competing interests here going on and we're -- we're drafting a Technical Information Bulletin that addresses all these issues in some detail. We just unfortunately don't have that complete right now.

DR. ZIEMER: Has -- is there any data in the literature, Hans, that you're aware of on -- basically, you could imagine an -- a typical case, a person is not standing still, they're -- they're moving around, and you sort of end up integrating all possible angles, maybe -- maybe

weighting it a little bit, but what -- what do you end up with? Is it kind of a weighted average of the extremes from -- from the acute angle all the way to the perpendicular?

DR. BEHLING: Yeah, I believe in the handout that Arjun had provided as part of an attachment you will see discrete measurements at -- at angles that start with zero, 22 and a half, 45, 67 and a half and 90. And you'll see obviously, as the energy photon -- energy is -- decreases, the -- the angle of dependence is much more pronounced. When you get to the point where you're measuring something like cesium 137, the issue of angle of dependence starts to diminish drastically. It's most pronounced at the energies of 100 to 200 keV, which is oftentimes the energy that we're talking about here, or sometimes even lower. And so if you look at the average value of zero, 22 and a half, 45, 67 and a half and 90, you end up with a value that is approximately a factor of two too low, based on a reduced response. And -- and I do intend to -- to provide NIOSH with the Hines and Brownell reference which -- from which that information

comes from. And I do believe, if I recall, that it does involve the 502 DuPont film, which is the more sensitive component of a two-component film badge that has a low sensitivity and a high sensitivity film, and I think the 502 is the high sensitivity film.

DR. ZIEMER: Now those are done just with films in the air, I believe, usually. It would be surprising to me if someone hasn't in fact done something similar with a phantom, looking at the angle of incidence on the badge but seeing the impact of that on organ doses by using implanted TLDs or something like that in a Rondo phantom. Do -- isn't there such data available?

DR. BEHLING: (Off microphone) I think Fix had done (unintelligible) that. There are some data that Fix has measured angle of dependence by means of a phantom.

DR. NETON: There's actually about five different studies that have been done contemporaneously -- within the last ten years, anyway. Fix has done it. There was a (unintelligible) study done from a 15-country radiation worker study that was just released

by IR where Fix was involved in that analysis. Grossfeldt* also, in *Radiation Protection Dosimetry*, published a -- an article related to this where he did a Monte Carlo simulation of what is the HP10 dose for dosimeters for -- not a dosimeter, for actually a ten -- one centimeter deep detector at various angles. And there's another article that was published -- I forget who did -- Tierrychef* published an article. So there's a number of data that are out there. Most of them indicate not as severe declines as indicated in the Hines and Brownell article. I don't know if the Hines article -- Hines (unintelligible) used a phantom or not. These all use either a Rando phantom, an ICRU sphere or a PMMA slab. So they -- they were done with some pretty good science, and they're readily available in *Radiation Protection Dosimetry* for anybody to look at, and that's what we're basing our analysis on.

DR. ZIEMER: Hans?

DR. BEHLING: (Off microphone) Yeah. The issue that also has to be addressed in some of the findings that are cited in our matrix is the uncertainty. I believe that -- for instance,

it's correct and Jim has pointed out, we can introduce this as part of the uncertainty. But if you look at the uncertainty discussion in Implementation Guide 1, you realize that it's really addressing only laboratory uncertainty. And of course laboratory uncertainty is defined by a very controlled exposure to a mono-energetic beam at zero degree angle, and it's acute exposure, et cetera, et cetera. So what we have to look at is uncertainty that goes beyond laboratory, and that is the radiological uncertainty which is part of this discussion here. And that is probably dominated by angular dependence.

DR. ZIEMER: Thank you. So is it -- is it correct to say that although you may not be prepared, Jim, today to say what -- as Denise has suggested, to say what those numbers are, when in fact it comes time for dose reconstruction you would in fact have analyzed and determined a number that would be used in some particular cases.

DR. NETON: Yes, we're very close. I just am not -- won't be able to release the document right now. I'm reviewing it currently. But I

think we will have a va-- this is a generic issue that was brought up in task three. It's not necessarily linked to Mallinckrodt. This is a complex-wide issue, I mean, and -- and to bring this up in the SEC evaluation, I -- I -- we weren't tasked with doing that --

DR. ZIEMER: No, no, I understand.

DR. NETON: -- (unintelligible) six high-priority issues.

DR. ZIEMER: Right.

DR. NETON: It was thrown into SC&A's report at the -- at the -- when it came out and we agree it's an issue.

DR. ZIEMER: Right.

DR. NETON: But we did not give it as high a priority as the other six priority issues that we were evaluating --

DR. ZIEMER: Right.

DR. NETON: -- as instructed by the Board.

DR. ZIEMER: Thank you. Board members, additional questions on the general topic of dose conversion factors? Though as I -- I would like to ask if the Board -- or if the subcommittee has some suggestions on how to proceed with the general task three findings

and how to go forward from -- with -- with that set of findings. Jim?

DR. MELIUS: Someone may have to refresh my memory or -- I seem to recall that one of our earlier discussions of this issue -- it had been pointed out that a number of these procedures have changed, that there were supplemental documents to them.

DR. ZIEMER: Well, for example, many of these, in practice, are replaced by workbooks.

DR. MELIUS: Right.

DR. ZIEMER: And so that one possible step in moving forward would be to identify which of these in fact are even utilized anymore -- or if they're utilized, are they utilized by way of a workbook.

DR. MELIUS: Right.

DR. ZIEMER: So that's one possible thing that we could ask be done by NIOSH, to tell us either -- well, what is your response. One response is we don't use this procedure anymore, or this procedure is superseded by a workbook, which may be subject to procedures review, too, under next year's task.

DR. MELIUS: Right.

DR. ZIEMER: Yeah.

DR. MELIUS: I would propose that we, you know, segregate in that way, we go through and sort this and categorize these. And those that are being used, then we, you know, set up a procedure where we request that NIOSH respond to them. And -- and then we take steps to -- you know, our usual sort of resolution process to -- to try to address these and that -- that for those of which have been superseded or supplemented, whatever you want to call it, by a workbook or a revisi-- revised document, that we then consider for, you know, their prioritization -- appropriate prioritization for SC&A review for next year. I mean I don't think we should spend time trying to review something that's already been changed. It just doesn't make sense. I would hope that NIOSH, in developing the workbook and so forth, would have at least read the document and tried to address concerns or make sure that appropriate technical concerns are addressed in what they've developed, but I don't think we need to spend time, given the length of time it's been since SC&A finished -- finished their review.

DR. ZIEMER: Are you making a motion then, which would be a recommendation to the full Board?
DR. MELIUS: I would so move.
DR. ZIEMER: Is there a second?
MR. GRIFFON: I don't know what the motion is.
DR. ZIEMER: The motion got lost in a multitude of words here.
DR. MELIUS: Yeah, let's try to --
MS. MUNN: You can second it anyway.
DR. ZIEMER: The motion is to ask that NIOSH, in a sense, segregate these to identify those that are still in effect and those that may have been superseded by -- by work-- workbooks --
MR. GRIFFON: I guess --
DR. ZIEMER: -- and then to address those that are still in effect. I think that's the motion.
DR. MELIUS: Yes.
MR. GRIFFON: Okay.
DR. ZIEMER: Are you thinking you want to second it?
MR. GIBSON: I'll second it.
DR. ZIEMER: It's seconded by Mike, okay.

Thank you. Now let's discuss.

MR. GRIFFON: Now I might friendly amend the motion. I mean my -- my only -- superseded, I'm a little concerned about that. I think all these are findings, and I -- I agree that if -- we don't want to go back in time, but some of these procedures were used for cases that were already done, so -- but what -- what I was thinking more of was to -- to look at the findings and determine whether we -- there's -- do go through our normal resolution process and then for those that we determine that this finding is addressed or -- or that this finding is sort of a -- is handled in a workbook which was not reviewed under this initial review, we can defer those as an action. We can defer that to the extent -- the next stage in the review process.

DR. ZIEMER: So I'm going to interpret here. I think Mark's concern is that insofar -- even if something is not currently being used or is superseded, if it in fact had been used to bring to closure some cases previously and was an incorrect procedure, one might want to know what the impact of that would have been on

those cases, and that would be --

DR. MELIUS: Well, I -- I would have a friendly amendment to Mark's friendly amendment. That would be that -- it seems to me that it would be more efficient to do that at the time of the -- the follow-up review that -- say there's a procedure, now it's been -- there's a workbook that supplements or changes that or whatever, that particular procedure. We ask SC&A to review that new process -- they would -- procedure, workbook, whatever it is. They've already got the review of the first one. Then -- then we consider them both at the same time, both the initial review and the -- the sort of follow-up review of the workbook. In that way -- if not, we're just going to spend a lot of time saying -- you know, NIOSH is going to respond and say we've already taken care of that, and then well, have they really taken care of it and -- you know, we'll go back and forth a lot. I just don't think that's a very efficient use of SC&A's time and effort, nor NIOSH's. And I still think we would be able to address the concern about the initial -- you know, potential impact on other ca-- you know,

earlier cases by NIOSH's -- you know, by NIOSH's response to the follow-up and so forth. I think that would get addressed.

DR. ZIEMER: Well, these friendly amendments are becoming so extensive even the Chair doesn't know what they are. I have a feeling that we're almost back to where you started.

DR. MELIUS: That was -- I'm -- so it's -- actually I reject Mark's friendly amendment for the reasons --

DR. ZIEMER: And withdraw your friendly amendment --

DR. MELIUS: It's not so friendly, Mark.

DR. ZIEMER: Basically what we're asking is for NIOSH to review these and kind of tell us which are still in effect, which aren't, and perhaps what their response is. And then we can --

MR. GRIFFON: Right, I -- I guess my -- and Jim spoke to my intent, which is to not lose a finding just because a procedure's got Rev. 2 out.

DR. ZIEMER: Right.

MR. GRIFFON: We don't want to lo-- you know --

DR. ZIEMER: And when we get that list back and if -- if -- we can look at that and say okay,

we -- we still want you to do something with this.

MR. GRIFFON: Right.

DR. ZIEMER: Are you ready to vote on this? We had a second. This would be a recommendation to the full Board in a meeting later this week to take action on.

All in favor, aye?

(Affirmative responses)

Any opposed, no?

(No responses)

Any abstentions?

MS. MUNN: I'm not sure what I'm voting on still, so --

DR. ZIEMER: Those that are so confused that they're abstaining?

(Indicating)

Okay, two abstentions. We will make that recommenda-- the recommendation will be for NIOSH to respond. That's really what we're recommending.

DR. MELIUS: I would also, though, like to recommend that we then move on to have NIOSH do -- their response would be just to identify what's been revised, but they would also

include a response to those that haven't been revised yet or supplemented --

MR. GRIFFON: Start the resolution process.

DR. MELIUS: -- (unintelligible) resolution process in place where SC&A would -- you know, what -- what we've done on other things.

DR. ZIEMER: I actually thought that was what --

DR. MELIUS: Okay.

DR. ZIEMER: -- part of the -- I interpret that as part of the motion.

DR. MELIUS: Okay.

DR. ZIEMER: Either what is the response to it or what -- whether it's in effect. Okay, we will so recommend.

I think we're ready now to address Bethlehem Steel.

MR. GRIFFON: I think the other --

DR. ZIEMER: Oh --

MR. GRIFFON: -- just -- just a practical thing on those lines is that -- that this is only a partial matrix, so I think SC&A will provide --

DR. ZIEMER: Yeah, I think SC&A has said there are some additional items that -- not yet appeared on the list with --

MR. GRIFFON: Just didn't have time to complete it, that's all, yeah.

BETHLEHEM SITE PROFILE

DR. WADE: As we get to Bethlehem Steel if I could just have a -- I was contacted by Kevin Riley of Senator Schumer's office, who asked if I would share with the Board the Senator's belief that the Bethlehem issue -- the Bethlehem site profile issue will not be fully resolved until SC&A has an opportunity to formally comment. Certainly that is not binding on this group, but he asked me to make that statement and I did.

DR. ZIEMER: Thank you very much. Let me remind the Board, we had an action at the February meeting. There were five motions made at the February meeting with respect to Bethlehem Steel. These are contained in the February Board minutes. There were a number of items that said the Board concurs with NIOSH's -- NIOSH's approach and so on. There were several outstanding items -- all our items are outstanding, actually, but these were carry-overs. Here's one of them.

(Reading) The Board requests that NIOSH and

SC&A meet to discuss and resolve any remaining technical issues related to SEC's (sic) comments and NIOSH's responses, and members of the Board should be present at the -- at the meeting.

And then let me identify for you those items which fell into that category. Let's see -- now let me just go down through -- work quickly.

The Board concurred with use of 95th percentile of distribution of air samples at Bethlehem Steel.

Board requested NIOSH review the use of ICRP default values.

Board concurs with NIOSH's characterization of aerosol size and density.

Board concurred with NIOSH approach to characterizing external exposures.

I guess that was it. Now you'd have to lay this beside the finding table of SC&A to see what the unresolved issues were, I guess. And I don't --

MR. GRIFFON: (Off microphone) Was (unintelligible) on breathing rate or the residual dose...

MS. MUNN: I think it was the mouth breathing thing.

MR. GRIFFON: (Off microphone) (Unintelligible)

DR. ZIEMER: (Reading) Board concurs with use of 95th percentile distribution of air samples at Bethlehem Steel to characterize upper limits of exposure. However, NIOSH should continue to evaluate other approaches to characterize exposures in the work environment similar to Bethlehem Steel, including better ways to characterize exposures to workers in high-risk job categories and better methods to identify such workers.

And then (reading) NIOSH -- review the use of ICRP default values for heavy work to determine if appropriate.

I think that was the issue of the --

UNIDENTIFIED: (Off microphone) (Unintelligible)

DR. ZIEMER: Yeah. Now in the meantime, there was a revision and you have all received some material from Mr. Walker, and should have received Larry -- Larry's reply -- Larry Elliott's reply -- or NIOSH's reply to -- to those issues that were raised by Ed Walker. So

insofar as those may be considered new issues, we may wish to respond or indicate whether or not we accept that response or not. I guess my question is is there anything else besides this that is new material that we need to respond to?

DR. WADE: (Off microphone) I mean if I could offer -- oh, Jim has his (unintelligible).

DR. MELIUS: Well, go -- if you want to clarify the sequence, which is what I was going to clarify.

DR. WADE: I mean I think -- you spoke to the motions that were made by the Board. It's my understanding that there were discussions between SC&A and NIOSH. NIOSH then prepared a revision to the site profile, a draft revision to the site profile. When the Board last met it -- it started to discuss it and then realized it didn't have that material in its hands for long enough, so we postponed discussion until this subcommittee meeting and Board meeting. So theoretically, what you have is the NIOSH revised site profile and a judgment at least to be made as to whether that (unintelligible) -- profile conforms with the

issues that -- that you have placed on the table. Then you have the Ed Walker material that you introduced, but it's that revised site profile that I think is the pertinent (unintelligible).

DR. MELIUS: Can I just add one more piece of information? We had also left unresolved at our last meeting as to whether we would have SC&A review the NIOSH response to the revised site profile, as well as their -- their response to -- to SC&A's comments. And right -- shortly after our last meeting, John Mauro sent all of us a e-mail -- okay -- asking whether he -- he -- they -- we wanted to formally task -- I think that's the correct verb, task them with doing a review. And I think we all dutifully didn't respond to the e-mail, so it's been left open. And I don't -- and when I checked just before the meeting, my understanding was that SC&A had not done any -- anything further. They'd not reviewed the revised site profile, nor have they responded to NIOSH's --

DR. ZIEMER: And in fact the Board cannot do that by e-mail anyway. We cannot task our

contractor --

DR. MELIUS: Right.

DR. ZIEMER: -- in that fashion, so -- so the absence of e-mails probably reflects the fact that we can't -- even if all of us had said yes, go ahead, it has no -- no bearing 'cause it's not done in a public forum, so -- any--

DR. WADE: So everyone understands, John's question was should SC&A proceed with the closeout process based upon the draft revised Bethlehem Steel site profile or await the final version to be posted. That was his question.

DR. ZIEMER: So what the Board really has before it then is -- is what to do with the revised site profile, vis-a-vis our contractor or closing things out. And now is it safe to say that -- does anything in Larry Elliott's response to Ed Walker become part of the NIOSH profile, per se, or is that simply a response?

DR. MELIUS: My reading of that -- of Larry's response was -- was that it -- it basically dismissed Mr. Walker's concerns, and I think -- I think addressed them by saying, in effect, that they had been addressed in the revised site profile. Is that -- correct

characterization, Jim?

DR. ZIEMER: It didn't appear to change however --

DR. NETON: Right, there was no modification made to the profile or the draft, I -- as -- and I think Dr. Melius characterized it appropriately there. We believe that the revised site profile substantially addressed a number of Mr. Walker's concerns.

DR. ZIEMER: Okay. So I think the question then remains what -- what do you like -- what would the subcommittee recommend to the Board as far as the revised site profile review? Dr. Melius.

DR. MELIUS: I would propose that we ask SC&A to -- we need to come to closure on this, but I think first we need to have SC&A review NIOSH's response, as well as review the revised site profile, which I think has made some significant changes, and -- and report to us on that at our next meeting, and we then try to come to closure on this.

DR. ZIEMER: Are you making that as a motion?

DR. MELIUS: I will make that as a motion, yeah.

DR. ZIEMER: Second?
MR. GRIFFON: I second that.
DR. ZIEMER: It's seconded. Now discussion, pro or con. Wanda?
MS. MUNN: Just a question. Do we have a feel for how many major items must be placed in SC&A's hands from this revised site profile? I -- I saw some changes, but nothing that --
DR. ZIEMER: Yeah --
MS. MUNN: -- appeared so major to me that it be --
DR. ZIEMER: -- Jim, could you or one of the staff just very quickly summarize -- I don't recall any really big changes.
DR. NETON: I think we were in substantial agreement with SC&A on most issues.
MS. MUNN: I thought so, too.
DR. NETON: I think the 95th percentile was -- there may be some issues left remaining there as to -- you know, what 95th percentile is used, I suppose. And the breathing rate issue we -- we chose -- we evaluated it and we -- we determined that we didn't believe we needed to make any changes, so that's certainly out there. The oro-nasal breathing and the -- the

use of the 1.7 cubic meter per hour heavy worker we're -- we're sticking with. So those are some issues that they need to look at and review our opinions.

DR. ZIEMER: What about changes in the profile itself?

DR. NETON: Well, the profile added the 95th percentile. The triangular distribution is gone.

DR. ZIEMER: Right.

DR. NETON: I mean that's a --

DR. ZIEMER: That was based on their recommendation.

DR. NETON: I believe we added some residual contamination issues related to in between rollings. I'm trying to think -- those are -- those are --

DR. ZIEMER: Well, my point is, I think the review would not require as substantial effort. Now I know everything you guys do is substantial, but you understand what I'm saying.

DR. MAURO: Jim has -- along with the revised site profile, Jim had also provided us with a very nice what I call white paper --

DR. ZIEMER: Yeah --
DR. MAURO: -- where he --
DR. ZIEMER: -- summarizing --
DR. MAURO: -- summarizing --
DR. ZIEMER: Right.
DR. MAURO: -- (unintelligible) I forget the number of items --
DR. ZIEMER: No, so you could -- you could step through it pretty --
DR. MAURO: And it is not going to -- it's -- it's a matter of us -- in fact, many of us have already read --
DR. ZIEMER: Yeah.
DR. MAURO: -- that material. It's really a matter for us to get together --
DR. ZIEMER: You haven't charged us for reading it yet, have you --
DR. MAURO: I've read it. I believe Arjun's read it, and I marked mine up. I have -- I'm formulating my -- my own thoughts on the matter, but I'd rather not discuss (unintelligible) --
DR. ZIEMER: No, I understand.
DR. MAURO: -- (unintelligible) an opportunity to caucus with (unintelligible) our team --

DR. ZIEMER: Right, right.
DR. MAURO: -- but we're not far away from being able to -- going down the list of items and having this material in your hands, certainly well before the next meeting.
DR. ZIEMER: Thank you. Yes, Robert.
MR. PRESLEY: What we -- what you are requesting them to review is not this draft, but the new revised site profile.
DR. MELIUS: Correct.
DR. ZIEMER: That's correct.
MR. PRESLEY: Thank you.
DR. WADE: I do think that what is out there is a draft.
DR. MELIUS: Yeah, yeah, yeah.
DR. NETON: The revised site profile is in draft form.
MR. PRESLEY: I want to make sure, though, that we're not going to review a draft and then somebody's going to come back and want to do a revised site profile.
DR. NETON: (Off microphone) Well, it's (unintelligible) --
DR. ZIEMER: (Unintelligible)
DR. NETON: -- the chicken or the egg. I mean

we -- we could finalize it, submit it to SC&A and then go through a negotiation process and issue Rev. 3. I mean -- but it's our best shot. We intend to -- we believe it's -- it's ready to go, but we -- I think it would better serve to leave it open as a draft rather than issue it.

DR. ZIEMER: Right.

MR. GRIFFON: Yeah.

DR. ZIEMER: Okay. Are we ready to vote on the -- the motion is to proceed to have it -- yes, Jim, a comment for --

DR. MELIUS: Just one more further comment. Some of these issues are also generic in the sense they will affect other site profiles and other dose reconstructions, so I think there's some value to making some additional effort on this --

DR. ZIEMER: On this first one, yeah.

DR. MELIUS: -- site -- particular site profile that'll help us in the -- the longer term, as well as I think contribute to the -- sort of the credibility of -- of the NIOSH -- of the new site profile.

DR. WADE: But also Robert's clarification is

not a trivial one. We do need, as a Board, to talk about when we take something in time to say here it is and then move forward from it. So Robert, your point is -- is strong and needs to be discussed.

DR. ZIEMER: Okay. Are you ready to vote then on this motion? The motion then is to recommend to the Board that this draft revision of Bethlehem Steel be reviewed by our contractor.

All in favor, aye?

(Affirmative responses)

Any opposed, no?

(No responses)

Any abstentions?

(No responses)

It's so ordered. Thank you.

DR. WADE: The only item that Mark had asked be talked about in the context of this agenda was possibly an update on where we were with Savannah River. I don't know, Mark, if you would like to (unintelligible) we have time. We also have a very tired group of folks, so...

DR. ROESSLER: So be short.

DR. WADE: But we could do that if

(unintelligible).

DR. ZIEMER: Just a status report in terms of --

MR. GRIFFON: The status report is it's in our hands.

DR. ZIEMER: Well...

MR. GRIFFON: And I -- I guess I just would say -- I think this was the first -- was this the first one provided to us, John, of the ones you reviewed? Savannah River I think was the fir--

DR. MAURO: (Off microphone) First one was Bethlehem Steel (unintelligible).

MR. GRIFFON: So -- so Savannah River -- yeah, so -- so after Bethlehem Steel, this was the -- so -- and I think we've got Hanford and -- in the hopper, and do we have another one? Anyway, I just thought we should initiate this and maybe sort of start the ball rolling, even if it has to be on the workgroup level. Let's get something going on this where we can have some discussion of the findings -- you know -- -- talk specific--

DR. WADE: Decide the steps you want us to take.

DR. ZIEMER: We don't have the Savannah River

on the agenda, though, per se --

UNIDENTIFIED: (Off microphone) No.

DR. ZIEMER: -- to --

MR. GRIFFON: I thought we did.

DR. WADE: I think it is -- is acceptable to talk about in terms of looking at SC&A's tasking for next year and our --

DR. ZIEMER: Yeah, yeah.

DR. WADE: So I think it's legitimate to talk about. I did send the site profile out to everyone. But it's the subcommittee to --

DR. ZIEMER: Yeah.

DR. WADE: -- as to how much detail you want to go into.

DR. ZIEMER: But I assume you will want a full re-- presentation, perhaps at the next Board meeting, of that. We're ready to go on that -- right, Joe --

MR. FITZGERALD: Yeah.

DR. ZIEMER: -- Savannah River? Yeah, you're --

MR. FITZGERALD: (Off microphone) (Unintelligible)

DR. ZIEMER: -- dust it off and -- right.

MR. GRIFFON: Well, I -- I don't know if

there's any -- I mean I -- I hate to wait to have all these things backed up for another Board meeting, so my concern is, is there any way between now and the next Board meeting that we can have some real work done on this thing at the workgroup level and come back with here's the list of findings, here's what NIOSH agrees with, here's their action -- you know, some resolution process (unintelligible) --

DR. ZIEMER: Well, one of -- one of the -- one of the possibilities, if we agree that the general process will be one where the findings go to NIOSH for the initiation of the resolution process, and I think the question here would be do you want that to happen before the Board has even officially looked at the document? I know you have it, but it has not been presented to us.

MS. MUNN: No, it hasn't.

DR. ZIEMER: Yes, Jim.

DR. MELIUS: Yeah, I concur with Mark. I think we need to get going on this, and I see no advantage of -- or necessity to wait to have a formal presentation. I think we'd be much better off being able to try to go from

presentation into resolution of this. It's a lot easier and I think it's a much more efficient process, and -- and I would hope that we could, either the subcommittee or the meeting -- come -- full Board meeting is sort of set up a schedule now to get some of these other ones moving --

DR. ZIEMER: Under way.

DR. MELIUS: -- Hanford and I can't recall what else, but we need to get those -- now obviously we can't do them all at the next meeting, but I think we ought to get some processes started to address these. And I think also -- some of these are old enough now we also have got to have some concerns about are there additional -- are there -- revisions or are there workbooks or other documents -- changes that -- that we ought to get reviewed so that we -- and handle those changes at the same time.

DR. ZIEMER: Let's get some other input and then we'll call for a motion, one way or the other. Wanda Munn.

MS. MUNN: Yeah. Do we -- it's been so long since I've looked at the Savannah River material, do you recall, Joe -- were there

extensive findings?

MR. GRIFFON: They can't remember everything we're doing.

MS. MUNN: I'm -- I'm just drawing a complete blank is the reason --

MR. FITZGERALD: Well, that's understandable. No, there were certainly some relatively significant findings. The high five, if you recall, that was one --

MS. MUNN: Yes.

MR. FITZGERALD: -- thing we wanted to certainly focus on and provide some feedback on, which the report does.

I might add that we did do an issue resolution process for the first phase of Mallinckrodt. I think you were actually there for that session in Cincinnati, and I thought that was a pretty productive session where we had a working session and went through the issues and findings and were able to provide the Board -- Board members were present, I think there were two or three present --

MS. MUNN: Uh-huh, worked very well.

MR. FITZGERALD: -- and that turned out to be I think a pretty productive use of time and it

moved the ball forward I thought fairly productively. We were able to identify where we had factual issues, where we had issues that needed to be resolved or where we agreed or disagreed, so that tended to move the thing forward.

That's the only time we actually attempted that was for Mallinckrodt the first time around, and we really haven't been back to that again. I think we've been sort of looking at Mallinckrodt in this process, gone on to other reviews. But that might be a possibility in the sense that that would be a working session. It would be focused on the issues, but you still -- what was unresolved from that which we can agree on -- or that which has been superseded by ongoing revisions to the site profile, which I think is an issue for things like Savannah River. So I just wanted to remind the Board that, you know, we did start that process. I think it's been called the six-step process. That process I thought worked pretty good at the beginning of Mallinckrodt. We haven't been back there again, but certainly that's a possibility for

Savannah, to both bring the Board up to speed and bring ourselves up to speed on the issues, and then get into a process where we can distill what's left that has to be addressed, and maybe get to the same place that task -- what is it, task three or four has been -- where task three has been where we can come up with a matrix and be very clear on where, you know, we need to resolve some issues.

DR. ZIEMER: Yeah, what the issues are and how they're resolved and track them (unintelligible).

Okay. Mark?

MR. GRIFFON: Yeah, I -- I actually -- you know, I actually think, since we're not busy enough with work on this Board, that we should do Savannah River and Hanford. That might be a little -- a little ambitious on my part, but they've both been out there a while and I hate to see them sitting there and having new revs come out while we're -- and have the workgroup take those up initially and come back 'cause that's where we can really get into the meat of these issues. And the Savannah River ones have come up -- you know, these -- the organically-

bound tritides and the high five are showing up in the procedures review, the first 20 cases, they're hanging -- they're ongoing, hanging issues that I think we need to just --

DR. ZIEMER: Let me suggest something to you here. Let's -- let's vote on the Hanford thing and then we can go ahead wi-- or Savannah River, rather, and then we can go ahead with Hanford and suggest that in the -- you may not necessarily want to put a timetable on it, but make sure that it's in the wings waiting to go as soon as the -- as soon as the contractor's able to do that, and NIOSH. I mean you're superimposing these things on some other things that they're working on, so -- Jim?

DR. MELIUS: Are we thinking -- is the subcommittee going to recommend a workgroup for that process and then maybe it's worth some thought as to whether -- I believe the meetings were held in Cincinnati, the one on Mallinckrodt, is -- is -- would -- is people's preference that two workgroups or have one workgroup that sits through them both, you know, for a two-day meeting or whatever? I mean not -- again, not necessarily that we

would try to then address both at the next meeting, but that we would have a process that's ongoing and give, you know, NIOSH and SC&A some time to -- whatever needs to be --

DR. ZIEMER: I think we need to hear from both NIOSH and SC&A whether that's feasible in terms of practicality of their staff and so on to -- Jim is saying, you know, can we do basically both of these back-to-back as -- get them both underway or do we need to sequence it?

MS. MUNN: Well, you know, this is -- this is a --

DR. ZIEMER: Wanda, a comment.

DR. MAURO: My expectation was that the month of September would be dedicated to moving out the last three site profiles -- Rocky Flats, Nevada Test Site and INL. So with regard to our task one activities, all of our resources are being dedicated to moving that out. However, that being said, I think we can take on the Bethlehem Steel. It's a very well-defined set of issues. We have been giving a lot of thought to that for quite some time, so we're prepared to take that on also.

I'd have to say, though, that to engage the

six-step process on Savannah River and Hanford in the month of September would be -- would over-extend our resources.

DR. ZIEMER: But in terms of the sense of the motion, it would be that as you're able to move into that, you wouldn't have to wait for another Board meeting; you would proceed. Isn't that -- you weren't necessarily, Jim, moving that they do -- start this this week or something.

DR. MELIUS: Oh, no, no.

DR. ZIEMER: It's just so you're not sitting there waiting for something to happen before the next Board meeting.

DR. MAURO: Oh, I --

DR. ZIEMER: What -- have you run out of stuff to do, we --

DR. MAURO: No, we would appreciate that. Just a --

DR. ZIEMER: Yeah, understand you have a workload and that's why I asked the follow-up question. Would you be prepared -- you want to do those sequentially as opposed -- that is Savannah River and then Hanford, versus -- and I ask the same question of NIOSH 'cause you

have issues to address in those cases, too.

DR. MAURO: From our perspective, yes, we can --

MS. MUNN: I cannot hear.

DR. MAURO: -- move those (unintelligible) once we clear the backlog of September, we can --

DR. ZIEMER: Once you know that you have the green light to proceed.

DR. MAURO: Yes, if you have -- if we have the green light to proceed, beginning of October we certainly could move forward with both, the Savannah River (unintelligible) --

DR. ZIEMER: Yeah, and again, subject to scheduling time with NIOSH and Board members.

DR. MAURO: Sure.

DR. ZIEMER: Jim, you want to add to that?

DR. NETON: We have a pretty heavy workload.

DR. ZIEMER: Yes.

DR. NETON: I don't think that we could commit to having anything done by the October Board meeting for those two processes, although we (unintelligible) engage in the Savannah --

DR. ZIEMER: At least get it under way.

DR. NETON: Under way, but to have that completed, resolution of this (unintelligible)

--

DR. ZIEMER: I think the sense of the motion, though, was to get it under way.

DR. NETON: We -- we are certainly in agreement with that.

DR. WADE: I think the spirit would be maybe an early October working group.

DR. ZIEMER: Jim, and then Wanda.

DR. MELIUS: I'd just point out that if we aren't able to address Savannah River at the next meeting, that would be putting it off until January of next year is our next scheduled Board meeting, and --

MS. MUNN: We can change that.

DR. MELIUS: -- that puts us further behind.

DR. ZIEMER: Wanda?

MS. MUNN: I can't believe that I'm the only member of this group who is physiologically and intellectually incapable of handling the processes of four or five sites at the same time in my brain. I just simply can't follow all those. I'm sorry. And I have serious questions as to whether or not this Board has the resources to be able to pursue, in a very focused fashion, two or more new site

undertakings in addition to the not-yet-closed issues that we have before us. I would far prefer to see our -- our decision made to take these in a logical sequence and to, if necessary, schedule more Board meetings and/or workgroup meetings than we have on our current calendar than to try to put two or more on the table right now.

DR. ZIEMER: Thank you. The motion before us is to give the contractor the authority to move ahead with NIOSH on the comment resolution process for Savannah River. You ready to vote on that motion? It does not have a timetable on it. We already understand that it probably wouldn't start till October and is subject to availability of NIOSH staff getting together with the contractor. But it does give them the green light to proceed. Yes?

MR. GRIFFON: Can I ask, when is our next Board meeting scheduled? Is it October --

DR. ZIEMER: 17th. It's scheduled for Oak Ridge, I believe.

MR. GRIFFON: I mean I would like --

MS. MUNN: Yes, it is.

MR. GRIFFON: -- a timetable on it, and even if

we have one preliminary workgroup meeting in early October -- I'm not saying that we're going to resolve all the issues, but we have to have that initial workgroup meeting to get -- to get a matrix fleshed out, where are we on these different issues, is there agreement, is there not, that kind of thing. So I would ask --

DR. ZIEMER: And I think John is saying that they would be prepared in October to -- sometime to get that underway and the workgroup would have to be involved in...

MS. MUNN: Yeah, we're scheduled October 17th, 18th and 19th.

DR. ZIEMER: Right, this -- this would probably be before that, but -- okay, you ready to vote then? This is simply on Savannah River.

All in favor, aye?

(Affirmative responses)

All opposed, no?

(No responses)

And abstentions?

(No responses)

It carries. Now do you wish to make a motion on Hanford?

DR. WADE: Before you do that, could you at least identify the workgroup members for Savannah River so I could begin to work to schedule a meeting?

DR. ZIEMER: We would like to have at least four individuals again.

DR. WADE: (Off microphone) (Unintelligible) take this up when the full Board (unintelligible).

DR. ZIEMER: We probably should do it in the full Board.

MR. GRIFFON: Yeah.

DR. ZIEMER: So everybody has an opportunity if they want to participate.

MS. MUNN: That's a wise idea.

DR. ZIEMER: But I would like to have four members, at least two of whom have -- at least are sort of technically oriented.

Okay, do you wish to take any action dealing with Hanford? Mark?

MR. GRIFFON: I'm a little scared to. I mean I -- I guess -- I guess I'd like Wanda's statement that maybe I'm willing to hold off on a motion on Hanford, but we might want to consider scheduling more workgroup meetings

and/or Board meetings, but you know, I think we need to -- to get that started soon to -- so maybe it's right after the next Board meeting (unintelligible) -- but I will hold off --

DR. ZIEMER: And there again, it doesn't -- it doesn't appear to me that -- that NIOSH is going to be ready to do issue resolution on Hanford by -- by October, in any event, so we can still take action at the next meeting if necessary.

Okay, thank you. Do we have any other items for the subcommittee today? If not, we're going to adjourn the subcommittee. Is there a motion to adjourn?

MS. MUNN: So moved.

DR. ZIEMER: Second? All in favor, please leave.

(Whereupon, the subcommittee meeting adjourned at 4:10 p.m.)

C E R T I F I C A T E OF COURT REPORTER

STATE OF GEORGIA

COUNTY OF FULTON

I, Steven Ray Green, Certified Merit Court Reporter, do hereby certify that I reported the above and foregoing on the day of August 24, 2005; and it is a true and accurate transcript of the testimony captioned herein.

I further certify that I am neither kin nor counsel to any of the parties herein, nor have any interest in the cause named herein.

WITNESS my hand and official seal this the 7th day of October, 2005.

_____

STEVEN RAY GREEN, CCR

CERTIFIED MERIT COURT REPORTER

CERTIFICATE NUMBER: A-2102