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

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ADVISORY BOARD ON RADIATION
AND WORKER HEALTH

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LOS ALAMOS NATIONAL LABORATORY WORK GROUP

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THURSDAY,
APRIL 29, 2010

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The Work Group convened in the Zurich Room of the Cincinnati Airport Marriott Hotel, 2395 Progress Drive, Hebron, Kentucky at 9:30 a.m., Mark Griffon, Chairman, presiding.

MEMBERS PRESENT:

MARK GRIFFON, Chairman
JOSIE BEACH
JAMES LOCKEY
WANDA I. MUNN *
ROBERT PRESLEY

ALSO PRESENT:

TED KATZ, Designated Federal Official
ISAF AL-NABULSI, DOE *
ELIZABETH BRACKETT, ORAU *
RON BUCHANAN, SC&A
ROBERT BURNS, ORAU *
ANDREW EVASKOVICH, Petitioner
JOSEPH FITZGERALD, SC&A
EMILY HOWELL, HHS
JENNY LIN, HHS
GREGORY MACIEVIC, DCAS
ARJUN MAKHIJANI, SC&A
JOHN MAURO, SC&A *
CHRIS MILES, ORAU
JIM NETON, DCAS
DONALD STEWART, ORAU *

*Participating via telephone

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

(9:31 a.m.)

MR. KATZ: Good morning, everybody. Advisory Board on Radiation and Worker Health. This is the Los Alamos National Laboratory Work Group first meeting, and we're all pretty much ready now here around the room.

Wanda, are you on the line?

MEMBER MUNN: Yes, I am.

MR. KATZ: Great. Good early morning to you.

MEMBER MUNN: Good morning, I think.

MR. KATZ: All right. We'll begin with the roll call, and please state whether you have a conflict as part of self-identifying, beginning with Board members in the room, with the Chair.

CHAIRMAN GRIFFON: Mark Griffon, Chair of the LANL Work Group. No conflict.

MEMBER BEACH: Josie Beach, Work Group member, no conflicts for LANL.

MEMBER PRESLEY: Robert Presley, Work Group member, no conflict.

MEMBER LOCKEY: Jim Lockey, Work Group member, no conflict.

MR. KATZ: And on the line?

MEMBER MUNN: Wanda Munn, member, no conflict.

MR. KATZ: All right. And then the NIOSH ORAU team in the room?

DR. NETON: Jim Neton, NIOSH, no conflict.

MR. MILES: Chris Miles, ORAU team, no conflict.

MR. MACIEVIC: Greg Macievic, NIOSH, no conflict.

MR. KATZ: And on the line, NIOSH ORAU team?

MR. STEWART: This is Don Stewart, ORAU team, no conflict with LANL.

MS. BRACKETT: I'm Elizabeth Brackett, ORAU team, no conflict.

MR. BURNS: Bob Burns, ORAU team, no conflict.

MR. KATZ: Welcome to all of you.

SC&A in the room?

MR. FITZGERALD: Joe Fitzgerald, no conflict.

DR. BUCHANAN: Ron Buchanan, SC&A, conflict with LANL.

MR. KATZ: And on the line?

DR. MAURO: John Mauro, SC&A, no conflict.

MR. MAKHIJANI: Arjun Makhijani, SC&A, no conflict.

MR. KATZ: Welcome to all of you.

HHS or other government officials or contract staff in the room?

MS. LIN: Jenny Lin, HHS.

MS. HOWELL: Emily Howell, HHS.

MR. KATZ: No conflicts. And on

the line?

MS. AL-NABULSI: Isaf Al-Nabulsi, DOE, no conflicts.

MR. KATZ: Welcome again, Isaf.

MS. AL-NABULSI: Thank you.

MR. KATZ: Very good. And then let's have public, members of the public, including petitioners and others, in the room?

MR. EVASKOVICH: Andrew Evaskovich, LANL petitioner.

MR. KATZ: And on the line? Any members of the public?

(No response.)

MR. KATZ: Very good. Then just let me remind everyone on the line, please -- you're all veterans, but use *6 to mute your phones when you're not speaking, please.

It's all yours, Mark.

CHAIRMAN GRIFFON: We're going to start this Work Group meeting, and this is looking at the later SEC period proposed by

the petitioner for LANL. And I think this is the first time, I believe, our Work Group has met. It was formed a little over a year ago, but there's been some ongoing work on that later period.

I know at this point, probably today, what is likely to happen is we're going to get SC&A to -- I thought it was worth having a meeting in person, especially since it's been a little while since we've looked at LANL, and I think it would be a good refresher for us to make sure we understand all the issues that are at hand here.

But I do think it's unlikely today that -- NIOSH hasn't had a lot of time with the SC&A recent document that I think we're all -- I believe everybody has the recent document put out by SC&A, which has their summary of their SEC findings. I believe this is April 2010, dated April 2010.

MEMBER PRESLEY: April 16th, 2010.

CHAIRMAN GRIFFON: Yes. So we're going to work from that. And I think that, again, it was beneficial to have this to have SC&A outline the issues very well, maybe have some preliminary discussion. I am hoping to have some preliminary discussion. But I would also understand that NIOSH needs probably a little more time before they're going to have any concrete position on certain things.

So I want to do that. But then also I want to give Andrew a chance to, after we go through this document, the major issues identified in this document, let the petitioner have the floor to summarize anything.

I would like to hear also if there is anything in the petition that he feels wasn't addressed or needs further attention and then maybe some discussion after that. And then we'll wrap up, I think, unless other people have other agenda items.

That is a brief idea of where I wanted to get today with the meeting.

MEMBER MUNN: Mark, this is Wanda. I'm sorry to interrupt and sorry to be apparently a little bit behind the curve. One of the things I was concerned about yesterday when I was beginning to review what I had before me was that I did not have anything recent with respect to LANL. So I must have somehow missed the SC&A document. Can we be more specific about when that was sent?

CHAIRMAN GRIFFON: Joe, can you help out? When was that circulated?

MR. FITZGERALD: Yes. Wanda, this is Joe Fitzgerald. That was created by DOE and was issued, I believe, last week.

MEMBER BEACH: On the O: drive.

MR. FITZGERALD: On the O: drive late last week.

MEMBER MUNN: Okay. So what I have on the O: drive ought to be --

MR. KATZ: A little more. It was the Friday before, I think.

DR. NETON: Yes. I think it was --

MR. FITZGERALD: The Friday before. The 16th of April was the -- should have been the date that's by the report. The report itself is April 2010, but it's April 16th.

DR. NETON: It says April 8th on the cover page, but it was received on the 16th.

MR. KATZ: And by the Board.

DR. NETON: Dr. Fitzgerald distributed it on the 16th.

MR. FITZGERALD: Right. Now, this went to the full Board, Wanda. So I think it's both on the O: drive as well as on email distribution.

MEMBER MUNN: The only thing I had noted on my O: drive was petition summary.

CHAIRMAN GRIFFON: If you need it, we can send it again right now.

MR. KATZ: It's definitely in your CDC email.

MEMBER MUNN: Well, I checked my CDC email, but go ahead. Don't let me hold you up.

CHAIRMAN GRIFFON: Well, we'll forward you one just in case, Wanda, if you can't find -- somebody can do that, right? Jim Neton is going to send it right away.

DR. NETON: If I can find it.

MEMBER MUNN: The petition documents that I am looking at aren't giving me the dates that I expected. All right. Thank you. I would appreciate it.

CHAIRMAN GRIFFON: Okay, Wanda. All right.

MEMBER MUNN: I just have an evaluation plan. All right. Thanks.

CHAIRMAN GRIFFON: All right. So

I guess, with that, I would like to -- I mean, I am going to mainly turn the floor over to SC&A to frame the issue, and then we can have some discussion after each major issue is framed, I guess, to open up the discussion.

And, Joe or Ron, I'm not sure what order.

MR. FITZGERALD: We'll play tag team a little bit.

CHAIRMAN GRIFFON: Yes.

MR. FITZGERALD: Let me just first say that I realize you have just received this document, and it's sort of been in DOE screening and whatnot, editing, and all of that, for about a month or so. But, in any case, we went about as far as we could go.

I want to emphasize they're preliminary findings because we went as far as we could go without the Work Group providing direction. We didn't want to actually dive into what I would call some definitive

detailed analysis, quite frankly, without the Work Group at least advising where they wanted us to focus on.

I mean, I think what we did was the typical focus review, meaning we took the evaluation report, did some on-site interviews, some I would call initial research to establish what's out there in terms of documentation, looked at some of the documentation of Greg's group highlighted for us. We did a classified review and brought Mr. Burns with us, as I recall.

So we did a number of things early on just to, I think, provide a perspective that we wanted to bring to the Work Group on its first session, which is what we thought were the issues, effectively sort of the SEC matrix that we typically provide from the site profile. In this case, this is a little different. This is the second part of a broader SEC. So we really -- the original

Site Profile is the one that we generated a while back.

So we had to glean from that as well as this preliminary review what we thought the issues were. And these are, in essence, the issues that we're going to get into.

What makes this, I think, this review, a little unique in a sense is that we don't disagree with some of the bottom lines necessarily that NIOSH provides, that, in effect, there were new procedures in place. I'm talking about mixed activation products, had new procedures in place, new technology came on the scene.

I think where we -- this is more of a general comment -- have more difficulties is whether in practice the technology and procedures were used in such a way as to improve the records, to improve the data in a way that would enable dose reconstruction with

sufficient accuracy as compared with prior to 70, 75.

There is where I think there is some ambiguity. And we have some questions, again, as a general comment about some of the use of surrogate nuclides. I think whenever we get into that realm of using surrogates or using these others to bound the doses, I think it raises some actual questions about the completeness and adequacy of the data to begin with, which if in fact, it is better after the first SEC period, then what is the reasoning for going through such lengths to use these surrogate bounding nuclides to get you where you need to go in terms of dose reconstruction? It's just not clear to us why.

And we have some questions about those techniques, but I think even before you get to this question, we have some questions as to the lengths that one goes to to find a

way to bound the exotics and mixed activation products if, in fact, because of the technology coming on the scene, the data is that much better. It's sort of prima facie; why are we doing this?

And in our research -- and we'll get into this in better detail -- we also have found documentation -- and we did a number of interviews -- that kind of supports this ambiguity, this questioning that we're posing. And you'll notice I'm not declaring any conclusions because I think, like I said, we agree that there was the technology, we agree new procedures, but we don't find necessarily that technology manifest in vastly improved records.

So it does put us in the sphere of saying, okay, how good is good, and is the work-around justified or is the data itself so flawed that, no matter what you come up with as far as an approach, it's not going to be

adequate.

And we found some findings. And it's troubling in a way. I'm familiar enough with the Department of Energy to know that the evaluations they tend to do are a bit like blunt instruments, not typically ones that would be inquisitive enough or probing enough to get into the bowels of the dosimetry program, not usually done by DOE, but we found an evaluation that dated back to January of 2001, which was actually focused on the in vivo program. It was done out of the DOE area office.

And they only had a couple of findings, but one of the key findings was their questioning the in vivo program as to why they didn't have the reference standard or calibrations for the mixed activation products for LAMPF or LANSCE, for example, and thorium-232. Even though those are required, they weren't maintaining those capabilities

and they dinged them for that.

The recommendation was the in vivo program accounting people needed to get together with the bioassay evaluation program and work out some kind of an agreement and because clearly there wasn't this communication of expectations between the two such that the in vivo program was aware of the need to maintain this capability to actually be able to do these in vivo analyses.

I could probably understand the 232 because, again, that was sort of an intermittent activity at Los Alamos. But the mixed activation products at LANSCE, well, that was actually -- and this is acknowledged in ER and that was kind of a mainstream exposure pathway, albeit one that's relatively short-lived. You know, certainly it was an exposure pathway for workers.

And to not maintain the capability to analyze or evaluate the mixed activation

products at LANSCE as late as 2001 and have to be reminded by DOE that that was a requirement, that was unsettling, and it sort of raised a question in my mind, how far back did that deficiency stand? I mean, they found it in 2001, said, you know, you need to do this, get together with bioassay and make sure you're doing it.

But, you know, so this raised some questions as to even though the technology was fully capable -- and I don't want to disparage that at all -- fully capable of discriminating these nuclides, it's not clear to me in practice that the lab was looking for or maintaining capabilities to always see it. And we didn't go any further.

Now I didn't ask the in vivo program to let me look at the library standards or then look over the history and try to get into some detail. This suggests you didn't have it in 2001. When did you have

it?

You know, that's a lot of work. And I think it's probably one that I didn't want to do before this Work Group met and wanted to certainly maybe get your reactions or perspectives as well. Maybe you actually do know what the situation was.

But, again, these are just indications of maybe some concerns or some questions regarding what I think is one of the hinge points to this question of where this breakpoint was going forward in time for this SEC and the capability to dose-reconstruct against these elements.

And you have the report. And we'll get into each issue, but now, certainly that is the over-arching question, and then there are some questions about if the data, in fact, didn't parallel the technology, they weren't collecting that much better data or maybe they weren't targeting it, is it

suitable or adequate to use these surrogate nuclides derived, perhaps, from other operations at the plant?

And it may be very well conservative, you know. Look at cesium-137. That's pretty conservative. But it sort of evokes the surrogate data policy, in a way, because you are trying to establish some equivalencies. You don't necessarily have reliable data for the issue that you're dealing with.

So you're going to use other data that was derived from other operations, and you're going to bound those doses with this other information, which may be suitable, but it certainly has to sort of pass muster with the kind of discussions and criteria that this Board has looked at and, I'm sure, NIOSH has looked at as well. You know, is there an equivalency? Is there a representativeness in the operations such that you can use this

surrogate information and apply it to bound?

So there are sort of two questions embedded in that. The first question is why are we doing it in the first place if, in fact, by 1975, the information is much better because we have better technology and better procedures.

And the second question is if we're applying this surrogate information in this fashion, does it satisfy the criteria -- and I won't go into all of that, that's a whole new work group -- but does it satisfy the criteria that would enable you to use that in a way which is acceptable.

And I think I have some questions on that, too, and they're laid out in a very preliminary way. And we have dived in to do a lot of validation, and this is something the Work Group has to think about, but that is the other question regarding how this works.

So I just wanted to give that

introduction because I think a lot of this gets into the how-to part, but I think in general, that is kind of where we are coming from.

MR. KATZ: Before you go on from the overview --

MR. FITZGERALD: Yes?

MR. KATZ: -- just quickly -- this is Ted Katz -- I think someone has joined us since we got started. And I have the volume down low here for the phone folks, but there is an awful lot of static on someone's phone.

So whoever might have joined us recently or taken themselves off mute, please use the mute for your phone when you're listening in, and if you don't have a mute button, please hit *6, which will mute your phone for us, because I'm just concerned that other people on the phone won't be able to -- they won't be able to cut out the static like we can here. Thank you.

MR. FITZGERALD: Okay. On issue number 1, Ron, do you just want to walk through the particulars? I think that's sort of the introduction, but I want to get into sort of the particulars. Is there a question or any discussion on the Work Group's part on that preamble?

CHAIRMAN GRIFFON: Not from my standpoint at this point, yes, yes.

MR. FITZGERALD: Okay.

DR. BUCHANAN: Okay. This is Ron Buchanan, SC&A.

Joe gave you the overall view. And I would l like to give a couple of clarifying points because I realize everybody is on different Work Group meetings and other agendas. So I want to make a couple of things clear.

Number one is that there are two issues, and they get tied together in the end, but two issues. Number one is mixed fission

products, mixed activation products.

Mixed fission products, of course, come from the fission reaction fuel cycle. Mixed activation products come from, sometimes, around reactors. Mainly at Los Alamos, it was from the LAMPF accelerator producing short- lived activation products which could be inhaled or you could get external exposure. In this case, we're talking about internal intake.

And so we have what we call mixed fission and activation products on one hand, and then we have the exotics on the other hand. And in both cases, we are using what we call surrogate, if that's the correct word, data for these because there wasn't a lot of information on the details of these other isotopes.

Los Alamos processed -- most all their work was plutonium, americium, tritium-type work. And so they assayed for

those on a fairly regular basis, especially in early years. We do come up with a problem in the `90s, and the bioassay went way down.

Anyway, they assayed for the primaries, we call them. Primaries are the americium, plutonium, uranium, tritium isotopes. And so we have a lot of data on that. And if there are any issues on that, that's mainly a Site Profile issue, rather than an SEC issue.

They also assayed for cesium-137, which is a fairly easy isotope to identify because it's higher-energy gamma in there. And so that is the main bulk of the data. They had some data on these other activation fission products and exotic radionuclides scattered through the data that they retrieved.

It's given in the NIOSH's ER. But according to ER, it was not data that was really too usable. And so that's the reason

it isn't going to be used for dose assignment or coworker data, and NIOSH can comment on that later if that is not correct. That's where I read it.

And so we have the two issues, the mixed fission activation products. We have the exotics, which are usually the heavier transuranic-type alpha emitters.

And so what has been done was I just want to briefly cover where they're coming from is that OTIB-0062 and 0063 provide some data taken from these primary nuclides. OTIB-0063 gives a breakdown of the data, the databases available.

There's really no data in there that the dose reconstructor will use directly. The dose reconstructor when he --

DR. MAURO: Ron, this is John Mauro.

DR. BUCHANAN: Yes.

DR. MAURO: I apologize for

interrupting, but by way of orientation for me -- and perhaps others might be thinking this also -- apparently there is a transition. There is an SEC to this facility that, what, goes to 1976?

MR. BUCHANAN: Seventy-five.

DR. MAURO: And I'm sorry if everyone is aware of this and I am the only one asking this silly question. Apparently there is a reason why the SEC was granted up to that date, and then there is a reason -- and what I am hearing is apparently something changed or might have changed.

And the problems that you -- the techniques that Joe referred to in his introduction and that you're about to go to in some detail somehow, in theory, resolve those problems.

In other words, whatever the problems were up to `76 that caused the SEC -- are you basically saying now we're getting

into something by way of practice and techniques changed or are supposed to have changed that allows them to reconstruct doses beginning at this date using these new techniques? I just wasn't sure.

You know, I guess I would like to have heard a little bit about what was the reason for the SEC and how does all of this bear on why is it, now that there is no -- why that date was picked. I guess I was a little disoriented on that. Just a quick one on that if you could give me a 30-second sound bite on that?

DR. BUCHANAN: Would NIOSH like to address that?

MR. MACIEVIC: Yes. Well, the 1975 date came up because of the first petition, that was the end date for that petition. We went to the end period of that time.

Post-`75, when you start getting

into `76, `77, the reason that we are looking at that period is the data from the worksheets that are being filled out by people. What are the title --

DR. NETON: Checklists.

MR. MACIEVIC: The checklists. There's a set of checklists, a program that was developed during that period that starts to address the issues of where the worker is working, what radionuclides that worker is working with, and the techniques of the in vivo counting are more addressed to other problems and more accurate during that period in the mid-`70s and onward.

So it was a good cut-off point, but the reason for -- the `75 was picked was basically the petitioner end-date that we went with that said 1975.

DR. MAURO: And the reason, though, was the inability to reconstruct doses from these exotics and --

MR. MACIEVIC: Right.

DR. MAURO: -- prior to `75 --

MR. MACIEVIC: Right.

DR. MAURO: -- for whatever the reasons are, and then something changed.

MR. MACIEVIC: Well, what changed --

DR. MAURO: And now you feel you can do the exotics?

MR. MACIEVIC: Yes.

DR. MAURO: Okay. That helps me. Thank you.

MR. MACIEVIC: And the reason for it is pretty much the checklists coming in and the program getting more refined in how they do the surveys. Our approach was, going forward, as Joe pointed out, you have a way of doing analysis at the site that may not fit all criteria that you were talking about.

We're not trying to justify the site as being a perfect site for doing all

this analysis, that they were suddenly radiologically perfect in how they were doing the approach. Our point is that, did we have enough information on people to be able to bound a dose using what data is there. And from the pre-`75 to the post-`75, we said, well, what is different in there.

And that is basically the checklists coming in to say we now are able to pinpoint more what is happening with people, where the radiological concerns are, how we would apply these surrogate data, which I don't like to use surrogate data, but how we would apply that is, now that you have areas that are being pinpointed more by the checklists and the surveys and the rad work permits, you can now say this material doesn't have the potential of being all over the site that we would have to somehow say, well, all missed doses for all people are going to have these radionuclides applied to them.

We can now say there is more specific information to say, if you're in this area, you would get this particular radionuclide applied with a missed dose. But you're not going to go apply all this data to everybody.

And that was the problem with the earlier years, was that you did not have specificity enough, that you would have to say these exotics could potentially be everywhere. But as you move on in time, you find they are not. They are more localized.

And as you localize them, now you can say the techniques that are the -- this technique of using the intakes of the primary nuclides and then applying them to the exotics, that technique would work if you can start to localize more where this material is, and that is what we came to.

Our approach is a much more general, overall approach to the site. And I

know we can be hit by saying the site was not perfect, and it wasn't by any means, but the point is are we missing something that there is some material out there that we in no way could apply a dose to it.

Now we'll get into the point whether or not our technique applies on the mixed fission products in that. And there are some data, some analysis that we would also have to do on that to show how that would apply. And that's why with this introductory meeting, we don't have that right there. But we need to go and show how we would apply all of this to answer these types of questions.

The `75 data -- and, as you move forward, there are obviously into the `70s, into the `80s and `90s, yes, the program gets more tight. But we're trying to say there isn't something there.

I mean, these are dose reconstruction questions, which is one thing.

You have a -- how much to apply a dose to a person that, like on neutron correction factors and other things that you come up with, how much of a dose is different than saying, we had no clue that there would be a dose and we can't bound this dose.

So that is our approach is that, yes, there are dose reconstruction questions, but they're not unsolvable and you can't -- that we could not put a number to it and this would be some just wild guess as to what we're doing.

DR. MAURO: In fact, you know, that sets the context for me. I don't know if anyone else benefitted from it, but I appreciate it. I think I have better context now. Ron, again, I apologize for cutting in, but please continue.

MR. FITZGERALD: Well, before you do that, I want to amplify, I think Greg kind of provided a nice highlight. Our particular

focus is on the data itself. I mean, on one hand, you know, there are these new procedures. A new day was dawning, so to speak.

The question is, okay, does the actual data reflect that or not. Is the data better in some fashion, more specific for certain events? You know, if you have a number of events happening at LANSCE, do you see the corresponding data there? Just -- is the data actually better, which to me is a validation step of saying, does that marry up to what we're seeing in terms of changes in operations.

And, knowing DOE, there's not always a step function. It's a lag. I mean, maybe it gradually got better over 10 or 15 years, but we're looking at `75 and later on and then looking at the ability of using checklists and RWPs and everything and being able to focus in on certain operations.

There, and again, I think the validation step for us would be simply, you know, again, in practice, was the laboratory successful through its RWP process and checklists to providing the in-kind information that would enable you to kind of narrow this focus down or not or was it hit and miss and got better over time and that kind of thing? And I think that's what we were looking at.

Now I've got to tell you it's a considerable amount of work, and the only reason we didn't do that, I thought it was a leap that we would not take and maybe we shouldn't take, anyway. Maybe it's something NIOSH would do. But we just wanted to highlight what our concerns were and then stop there.

So when you look at the report, it's going to be a little general in the sense that we didn't go through and actually said,

you know, here are the 18 examples of where we thought maybe the checklists and RWPs didn't deliver the goods. We just wanted to say, I think that's what you would need to do if you wanted to hold this premise up. And we'll stop there.

MR. MACIEVIC: Exactly. And I wanted to say that -- this is Greg Macievic -- that I agree in that what we did in doing this, our data capture, is they are basically a sampling. We went out there and said, okay, here is an idea of how -- we looked at the data on what we had. We have not collected everything that is out there.

So, I mean, we're -- you know, we looked at the data and said there's sufficient evidence to show that there was a programmatic way of containing this and based on what we collected so far.

But, you know, it still can be left open to interpretation because of the

fact that you have not looked at all of the set of what is out there. And because these exotics were not a common thing, when you're hitting through files, you're not going to run into this very large set of data that's out for these particular things. You're going to have to look over lengths of time, more specific in time to pick out the information to just see what is actually there in a wider sense.

But from what we have seen, we feel we can cover it. But in your side, you're saying, you know, that you haven't seen enough essentially to justify the method.

MR. FITZGERALD: And, really, not to find the one exception to the many there, so much as just whether the characterization --

MR. MACIEVIC: Right.

MR. FITZGERALD: -- follows through in practice. So we're not looking for

a gotcha. Here's one you missed. But more to say that, yes, in practice, the systems that were put in place at that time would enable confidence and relying on that information.

And we also see a bit of a sea change. Maybe that's too strong a word but certainly a change in the records themselves that would distinguish this period of time, after `75, from the prior period of time, for which the SEC was granted. So that -- and again, we can go through some of the details, but --

CHAIRMAN GRIFFON: I think Jim had a comment.

DR. NETON: Yes. Basically I think Joe kind of --

CHAIRMAN GRIFFON: All right. All right.

DR. NETON: We adopted a weight of the evidence approach here. I think this is the first time we have actually -- or one of

the few times we have gone out and we're relying on the quality of the radiation protection program to document that the exposures were maintained at a reasonable level and we can assess what that level is based on that documentation. That's something I always believed we had.

CHAIRMAN GRIFFON: Yes, yes.

DR. NETON: And we have not been successful doing that. NTS is a good example. We had a lot of bioassays at NTS, but we couldn't come up with substantive documentation to support the rationale behind it. I think here we believe we do. And we're prepared to talk about what level of validation people might want for us to demonstrate that.

Just one other thing. I would like to bring up this issue of surrogate data. The point of confusion -- I prefer not to use the word surrogate data in this particular

situation because, at least in NIOSH's perspective, our terminology for surrogate data, at least in IG-004, is data used from one site, picked up, and directly used at another site.

This is data within the same site. So if there are no objections, I would prefer to call this substitute data or something of that nature, just to avoid confusion. Especially in people's minds who read the transcripts and see surrogate data throughout will not be confused into thinking that we're using that type of data. It's just a suggestion.

MR. FITZGERALD: Just to amplify on that, I think our concern, though, is somewhat --

DR. NETON: It's similar.

MR. FITZGERALD: Right, similar, but it's just different.

DR. NETON: We have adopted our

approach to --

MR. FITZGERALD: Okay.

DR. NETON: -- define surrogate data from one site to another, and this is internal to the site, and certainly there are things that need to be looked at very carefully when you do that.

MR. FITZGERALD: Okay. Thank you.

CHAIRMAN GRIFFON: Before Ron continues, can I ask, for the `75 petition, usually we have a summary of the justification for that petition. Does someone have that available so I could read that part out? Like, we should not read a certain internal dose for exotic radionuclides and for -- maybe while you're looking for it, Ron can continue. I would just like to hear that just because it's --

MR. FITZGERALD: Do you mean other Evaluation Report from the earlier period?

CHAIRMAN GRIFFON: The earlier

period.

MR. FITZGERALD: Yes, I have it. I have a hard copy.

CHAIRMAN GRIFFON: We have the final Class Definition, right --

MR. FITZGERALD: Yes.

CHAIRMAN GRIFFON: -- that would include that language? I just think it might give us context as we discuss the next period and this change that we have been talking about. You've got it? Yes.

MR. EVASKOVICH: Well, I'll mention the Class Definition. There's going to be a change in the Class Definition, though.

DR. NETON: Yes, it's minor, but it's all employees now --

CHAIRMAN GRIFFON: Okay. Right.

DR. NETON: -- rather than certain technical areas but justification for awarding the Class --

CHAIRMAN GRIFFON: That's what we really want to get at. Yes. Thanks. Oh, yes. We did change it to all workers. That's right. I remember that.

DR. NETON: I have -- it may be in the Board's letter.

CHAIRMAN GRIFFON: Yes. In the Board letter, we always summarize why.

DR. NETON: Yes. Let me see if I can find that.

CHAIRMAN GRIFFON: Yes. That would be -- that is what I am looking for.

DR. NETON: I have an HHS letter to Congress here.

MR. KATZ: Sometimes an HHS letter is a little more robust than the Board letters.

DR. NETON: Yes. Well, I can maybe summarize a little bit. The NIOSH review of available monitoring data -- I'm reading from the letter of HHS to Congress.

They found that they lacked adequate information necessary to conduct individual dose reconstructions for a number of radionuclides during a significant percentage of the time period. The Board concurred with that.

This is pretty -- oh, here we go.

CHAIRMAN GRIFFON: Is this --

DR. NETON: That's pretty big, yes.

CHAIRMAN GRIFFON: Is this for a number of radionuclides? It's stated that way. Okay.

DR. NETON: My recollection --

CHAIRMAN GRIFFON: I thought it was more specific than that, but --

DR. NETON: It was mixed fission -- I thought it was fission activation products as well as the exotics.

CHAIRMAN GRIFFON: Okay.

DR. NETON: It was both of those.

CHAIRMAN GRIFFON: That was what I was getting at, yes.

DR. NETON: Jenny has that somewhere at the end, Mark. You lack the information methods for bounding at least some of the internal doses for the more exotic radionuclides. But I thought fission activation products was in there as well.

CHAIRMAN GRIFFON: I thought that was specified. That's what I wanted to ask.

DR. NETON: Part of the reason was if the whole body counter --

CHAIRMAN GRIFFON: Right.

DR. NETON: -- came into more prominent use in the 70s, the early 70s.

CHAIRMAN GRIFFON: Right. That's what I thought. But the definition, it did include the exotics as well.

DR. NETON: Yes.

CHAIRMAN GRIFFON: Okay. Part of the reason I was asking is I didn't know if

the primary basis was for the inability for the mixed fission products and mixed activation products --

DR. NETON: I'm pretty sure it was both.

CHAIRMAN GRIFFON: It was both. It was both. Okay. All right. Sorry for that sidetrack, but John did it to me, you know. He started it.

All right. Ron, you can continue on that item.

DR. BUCHANAN: Okay. This is Ron Buchanan of SC&A again.

And, again, I want to kind of put everybody at the same point here. And this is really issues number 1, 2, and 3 in the report because you can't really separate them too well. And so that's what I'm trying to recap from my semi-technical point of view.

Where we left off was the fact that we have mixed activation fission product

monitoring and we also have questions about it. And we also have the exotics, which was usually the alpha emitters, the heavier isotopes. And so how are we going to assign dose when we do a dose reconstruction for these isotopes?

And, as I said, there was some data. NIOSH didn't publish data for these exotics and mixed fission activation products which was substantial enough. And so they are using substitute data to assign dose.

And OTIB-0063 and OTIB-0062 was created to assist the dose reconstructor when they actually do the dose reconstruction. And so what the dose reconstructor does in dose reconstruction, they look at the bioassay records and the external records, of course, of the claimant and assign dose according to that unless there is some OTIB that they use to look at additional data.

And in this case, if the worker

did not have bioassay or sufficient bioassay for the primaries or an unmonitored worker needed to be assigned primary -- doses from primary radionuclides, then they would refer to OTIB- 0062 and use the -- pages 21 and 23 is actually where -- OTIB-0063 and 0062 boils down to about 3 pages. And that's pages 21 to 23 for the primaries and also the exotics.

And so if they were lacking primary information, they would use this as a coworker data. If they were lacking exotic data, which I assume they would be since most -- we didn't have sufficient data for that. They would use one of the primary radionuclides to assign this bounding dose for the exotic.

And then if it was a mixed fission activation product, they would use pages 22 and 23, the cesium 137 coworker data. Okay.

And so I guess SC&A's bottom line on this, other than Joe's question about using

this approach, the technical questions that SC&A is posing in their reply to the ER is for the primaries, we have -- if you're going to assign primary dose using this coworker model, the data stops at 88 and so the SEC is through 05.

And so our question is, what about using the 1988 data for up to 05 and for the primaries and for the exotics? And then how do you justify using the exotics, primaries for the exotics, if they operated in a different realm than the primaries?

And then the cesium 137 stops at 93, and are we going to use that up through 05? And then what about the equivalents? Both for the activation and the primaries, exotics, has there been any benchmark? Is it possible to do any benchmarks to compare what data do we have for the mixed activation or the exotics, and say, okay. Here is some correlation between cesium 137 and activation

products or fission products. Here is some correlation between the plutonium and curium or whatever it might be to show that, yes, this person was monitored for both and we do have a correlation, do we have some benchmarking on that?

Joe talked about the technique. Did we have a correlation between events and recorded information in the worker's file? And I would also like to pose one of the ways to validate the proposed methods that NIOSH is proposing is, is there any benchmarking to show that, yes, there is a correlation in some of these instances where we do have data.

And so that gives you an overall kind of view of the technical question that we have raised.

MR. MACIEVIC: The question about the 1988; the updated internal, external, and the coworker have it up to 2005. So that data is all in there now for these radionuclides.

So the tables on the old document only went to 1988. They've been updated to 2005. So we're covered in that range there.

DR. BUCHANAN: OTIB-0063 --

MR. MACIEVIC: Yes.

DR. BUCHANAN: OTIB-0062 --

MR. MACIEVIC: Sixty-two, yes.

DR. BUCHANAN: -- 0062 will have through 05?

MR. MACIEVIC: Right, right.

DR. BUCHANAN: Okay.

MR. MILES: Yes, the official document.

MR. MACIEVIC: When they came out -- I think it was in October of 09.

DR. BUCHANAN: Right.

DR. NETON: We have them?

MR. MACIEVIC: Yes. They've been approved through the system. So they should be out.

DR. BUCHANAN: Okay. So they will

go. Okay.

MR. FITZGERALD: So they're on the O: drive?

MR. MACIEVIC: Yes. You should be able to get them.

DR. BUCHANAN: They're on the O: drive at this time?

MR. MACIEVIC: Yes.

DR. NETON: They're on our website.

MR. MACIEVIC: Right.

DR. BUCHANAN: The last time I looked, I didn't find them, but I hadn't looked real recently.

CHAIRMAN GRIFFON: And that was for the primary radionuclides, right? I'm trying to follow the three or four.

DR. BUCHANAN: Yes.

MR. MACIEVIC: Yes. All of the radionuclides that went up to 88 have been extended, as you know, to 2005.

CHAIRMAN GRIFFON: All right. Okay.

MR. MACIEVIC: I'm trying to remember what the other points you had there, I want to answer your questions.

DR. BUCHANAN: Yes. Well, any benchmarking that shows --

MR. MACIEVIC: Oh, yes. On the benchmarking, we have not done any benchmarking with the actual data that we have found. There is stuff out there, but we have not done that.

What we have done is sample DRs to show that you have examples where using these models can produce compensable and noncompensable cases for a hypothetical worker under different criteria.

So to basically say that this is not unreasonable and does not give excessively high doses to people so that, depending on the cancer, you can have a compensable or

noncompensable case.

But yes, verifying them through data from actual -- data from the exotics to apply our model and compare that has not been done.

DR. BUCHANAN: Do you think that they're --

CHAIRMAN GRIFFON: I'm sorry. I was trying to understand what analysis you did. You ran the coworker models to see --

MR. MACIEVIC: We did it on --

CHAIRMAN GRIFFON: -- if it wouldn't be all over 50 percent for all candidates --

MR. MACIEVIC: Right.

CHAIRMAN GRIFFON: -- so high that --all right. Got it.

MR. MACIEVIC: Exactly. Exactly.

CHAIRMAN GRIFFON: Got it. Go ahead, Ron. I'm sorry.

DR. NETON: Just one. I just went

up to our website. The OTIB-0062 is not listed on our outside website at this point because it's not compliant with -- what we call 508-compliant, it doesn't meet the Americans with Disabilities Act requirements. But it should be on the O: drive.

DR. BUCHANAN: Okay.

DR. NETON: It's not on the public website.

DR. BUCHANAN: In your work, have you found, is there any possibility of some of the claimant files having both the primary and the exotics and/or mixed activation products, that benchmarks could be done?

MR. MACIEVIC: Well, that was going to be one of the things that, in looking at this as an extended answer to this question, we will go and look.

And I can ask Don Stewart, have you seen anything in the cases that you have seen so far of that potentially being there or

not?

MR. STEWART: What potentially being there, Greg? I'm sorry.

MR. MACIEVIC: Of having data for the exotics in them as well as data for the primary nuclides so a comparison could be taken from a claimant's file, as opposed to going out and finding other data from Los Alamos to go and do the analysis.

MR. STEWART: I see what you are saying. Typically, no. The problem with exotics is that they are, well, exotic. And, you know, the time period we are talking about, post-75: work with these radionuclides was extremely uncommon.

So we're going to only get maybe 30 percent of the people through our program. And it could be that a number of people who work with a given radionuclide, one of the exotics was very small, less than ten. And the chances that we are going to look at that

case are very small.

DR. BUCHANAN: What about the -- this is Ron Buchanan.

What about the mixed activation or fission products? Are there any cases where you found both cesium 137 and an activation product in the record?

MR. STEWART: Off the top of my head, I could not tell you, Ron. I actually couldn't.

DR. BUCHANAN: Okay.

MR. STEWART: It's been some time since I worked kind of modern-era LANL claims because largely they have all been processed. Right now we are working the through-76 partial dose reconstructions.

I am sure that it happened. I know that I have seen cesium 137 results. I have seen odd results in what I would call odd results in the in vivo stuff.

Typically at Los Alamos, you are

going to see a lot of plutonium bioassay. And we do see that. We do see both in vitro, in vivo. Typically what we'll do is see that. And the presumptive exposures are primarily composed of that.

DR. BUCHANAN: All right.

MR. FITZGERALD: I guess my question would be -- I know cesium 137 certainly would be intuitively bounding, but why was cesium 137 used as the substitute for the mixed activation products? I'm not sure I saw that explanation.

MR. STEWART: You have a lot of data. I think that was one reflection. I just have data on it.

MR. MACIEVIC: Exactly. That's pretty much it.

MR. FITZGERALD: That's pretty much it?

MR. MACIEVIC: And we could -- yes.

MR. MILES: Easy to see.

MR. FITZGERALD: Right, easy to see, you have enough data.

MR. MACIEVIC: And that we felt it would be conservative to the numbers you're going to get. So we went with that and have a large database.

MR. FITZGERALD: And, you know, the one table in the ER where it's sort of the data points for each nuclide and I think it wasn't anything listed for mixed activation, but there were some other species that were listed early in 07 and some of the other -- probably LANSCE-related, short-lived nuclides. There were a fair number of hits.

But I think, even though that was compiled, I guess the conclusion was maybe some of what Don was saying. It wasn't particularly usable for purposes that would make it better than cesium 137 as a substitute.

MR. MACIEVIC: That's pretty much it because then you are into -- when you are dealing with these, some of these exotics, except for the cesium, you start getting into less and less data. And the trick was how do you cover that and cover it to a conservative way and to use this data. So that is why we went with that approach.

MR. FITZGERALD: So in a sense, it almost strikes me -- I don't know -- the substitute for cesium 137 -- I don't know, it was almost an intuitive substitute. I mean, it -- certainly it was more data and from a health physics standpoint, admittedly, a pretty conservative pick.

But beyond that, you know, I was looking for something more direct, but I think, does that character -- that was the pick because there was data.

MR. MACIEVIC: Let me ask -- Liz Brackett is the person who did the analysis on

all the data --

MR. FITZGERALD: Right.

MR. MACIEVIC: -- to compare the different things together. Liz, do you have a -- can you chime in on that?

MS. BRACKETT: I don't know what comparisons you're talking about.

MR. FITZGERALD: Why cesium 137 in particular, other than the fact there was data for it and sort of everybody knows cesium 137 would be intuitively bounding because it, you know --

MS. BRACKETT: Well, it was chosen for the coworker study because that's where you have the most positive results. For the rest of the nuclides, you typically don't actually see anything. And so it's not much of a coworker study when all of your results are negative. So that's part of the reason. It's something that you see most often and that exceeds the MDA.

So you can actually do some statistical analysis of the results. And that's why it was one of the nuclides that was chosen also for OTIB-0054, which was mixed fission and activation product analyses.

MR. FITZGERALD: But I guess, again, I'm just struggling with what its bearing is on like a facility like LANSCE. I mean, we are dealing with the off-gassing short nuclides. And if you had somebody who claimed that they worked there and was exposed, you would apply the substitute nuclide to which you actually -- maybe one of the few that you do have a positive reading for.

But it doesn't -- and this gets to -- you know, I won't use the surrogate, but it gets to this question of what the relationship is, what connection is there other than the fact that you have more data for it and it's intuitively more, you know, from a health

physics standpoint, conservative.

I'm just kind of struggling with it. You know, you could probably have picked --

CHAIRMAN GRIFFON: Plutonium.

MR. FITZGERALD: Plutonium if you really wanted to take it even further out. And it just doesn't -- we just can't get there.

DR. NETON: I don't think we're assigning it to cesium, are we? Wouldn't we apply the data product mixture to this analysis? I mean, I know what you're saying, though. Some sort of scaling factors apply relative to the other. It wouldn't just be cesium people were exposed to.

MR. FITZGERALD: Well, yes. I was just trying to figure out what the -- is there any relevance to a particular situation? In this case, mixed activation products, we think LANSCE or LAMPF because that's where a lot of

it was generated. So you might actually have a number of workers that would fall into that, including guards that might have been there and that kind of thing.

And if it was strictly cesium 137, you know, and we're being a little facetious, but why not plutonium? You know, it's sort of like you could apply almost any nuclide if you had a lot of data for it and it was conservative.

So I don't quite understand the substitution with cesium except for those reasons.

DR. BUCHANAN: For example, let's put in an example. This is Ron Buchanan of SC&A.

Say you had an iron worker or an experimenter or something on LAMPF and he gets an intake of mixed activation products of some sort at LAMPF that has nothing to do with cesium 137. Cesium 137 is a fission product

which comes from the reactor fuel cycle.

And so we have data on that at Los Alamos from workers that had been bioassayed for cesium 137 that worked with fuel or some aspect of the fuel cycle. But that really has nothing to do with the electrician or the iron worker or the experimenter at the accelerator inhaling a mixed activation product of something short-lived.

So I guess what we're saying is how do we connect something that was from a fission reactor fuel cycle and that's the bioassay results we got that really has no relevance that we can see directly to a person working in the accelerator and takes it into -- that's what the product -- even though it might bound it, we can't see that the substitute -- there's a technical link that connects those.

MR. MACIEVIC: Well, that sounds like something we will have to show the

connection to in order to satisfy that question.

MEMBER MUNN: Ron and Joe, although obviously you have done nothing except just scan this document that you have presented to us last week, the burning question is the one that comes up over and over again that we don't very often address directly and that is not necessarily why do you choose one radionuclide over another when you're doing these calculations, but the real question is, how significant are the exposures that you're dealing with?

As you mentioned in your conversation, if you have short-lived isotopes that are a result of the accelerator activities, rather than the reactor activities, and those short-lived isotopes are none that have real in vivo measurements that you can point to, even given their potential existence, how much of an effect, how much of

an exposure can one really anticipate from that rare individual who was involved in that unusual circumstance?

The question is, how significant are these few exotics that we're talking about? If it's one that -- if it's addressed in your paper, I didn't see it, but, of course, as I said, I only just glanced at it. But that seems to be key when you're dealing with an individual dose reconstruction.

MR. FITZGERALD: Yes. Wanda, yes. Yes. I know exactly what you're talking about. And we have for other SECs, it's kind of regular time. Now I'm just working through establishing exposure pathways as a prelude to doing anything else.

You're right. Certainly exposure pathway has to be identified before one starts working out the ability to dose-reconstruct.

However, in Los Alamos' case, I think we are in violent agreement because I

think the evaluation corps acknowledges mixed activation product as a potential exposure pathway. In fact, it's figured in the earlier SEC for the lab. So we just didn't spend time trying to establish or validate whether these provide an exposure pathway but acknowledge that the ER acknowledges that and moved on from there.

So yes, we don't disagree with the ER that these exposure pathways exist. Now, questions about how much dose in the end, I don't know if that's relevant to dose reconstruction.

I think the exposure pathway exists and workers would have been exposed. And the question is, is dose reconstruction feasible. I think that is what we're grappling with.

MEMBER MUNN: I guess it depends on how you are viewing that question.

DR. NETON: I agree with what is

being said here. We need to demonstrate some connection between the use of cesium and whether we use some scaling factors like we would in the TIB- 0052, I think we had, where we can focus the ratio of the fission products in a reactor setting versus an accelerator setting from the activation products and demonstrate that what we're doing would be valid.

I totally agree with that. I think we're just not prepared to come up with alternatives.

CHAIRMAN GRIFFON: I'm sure. I've been trying to keep track of actions also through this meeting. And I'm sure that Greg will keep notes and Joe for SC&A.

DR. NETON: Yes.

CHAIRMAN GRIFFON: But I have that one certainly that you'll look into the cesium question. The other thing, I think the 1998 thing sort of goes back to SC&A to look at

this updated TIB-0062.

DR. NETON: Right.

CHAIRMAN GRIFFON: But then this benchmarking question, I was a little unclear. It sounds like Don on the phone basically said that there's maybe nothing to look for. Do you want to investigate that a little further, I take it, Greg, or --

MR. MACIEVIC: Yes. We can look through the files and see if there is a case where we can benchmark.

CHAIRMAN GRIFFON: Right.

MR. MACIEVIC: But my concern is if we come up with one or two cases, will that show that it works and then come back and say, well, we need 40 more?

MR. FITZGERALD: Well, you know, it sort of speaks to -- you know, this is the interesting evaluation process because we're trying to, I think you said earlier, look at the lab's approach, which includes a lot of

things and whether that approach is reflected -- and this is where the validation comes in -- in the actual records and practice and that is all we're talking about.

MR. MACIEVIC: Right.

MR. FITZGERALD: And if one can see that reflected in the records and the practice, then I think there is some confidence that you can then go and apply these other approaches, which also need to be validated.

But, you know, to me there are two separate questions, one of which is, can you see it in practice and then is the approach, whether it is a substitute, like cesium 137 -- is that feasible to apply that or not? Can you validate that?

DR. NETON: I think I see two issues, two main issues, which is the benchmark to compare the exotic radionuclides to the primary radionuclides to monitor

somehow provides some better substantiation that they are indeed similar to the categories.

DR. MAURO: Jim, this is John. Usually the cesium 137, I presume that's chest count that you have lots of data for?

DR. NETON: Yes.

DR. MAURO: The discussion we're having right now is using that data as a substitute -- and correct me if I'm wrong -- for both activation products and fission products. I could see --

DR. NETON: Well --

DR. MAURO: -- or not?

DR. NETON: We need to look at that, John.

DR. MAURO: Okay.

DR. NETON: The question in my mind is whether cesium is appropriate to be used for an activation product.

DR. MAURO: All right. Because my

first reaction is the idea of using cesium for fission products seems to be a lot more intuitively --

DR. NETON: Yes, yes.

DR. MAURO: -- sensible, as you did in OTIB- 0054. But I have to say applying it for activation products, as Ron explained, seems to be pushing it a bit.

DR. NETON: Right. And not only do you have a problem with -- even if you applied it and it runs some sort of bounding dose, you end up with the issue of different cancers have different concentrations of different nuclides.

So if you have manganese 54, it's going to behave somewhat differently in the body than cesium, which is a whole body dose. So I can agree with that.

I think we need to go back and sort of look at the overall exposure potential for these activation products, which tend to

be --

CHAIRMAN GRIFFON: Yes.

DR. NETON: They're pretty low and somewhat episodic, I would think, although things like beryllium and stuff, I mean, they are probably site-wide issues because you can't contain them very well.

DR. BUCHANAN: I would like to clarify that OTIB-0054 is for fission products, not activation products. So extrapolating --

DR. NETON: Right. You're right. So basically the question is, what would we use for activation products.

MR. FITZGERALD: But, you know, stepping back from this, you know, looking at it as a two-part thing, I think that would be sort of the benchmarking or validation on the second part.

The first part, understanding the episodic nature of maybe exposure to these

exotics and mixed activation products, sort of thinking this through and saying, how would you do it. Well, if you could marry up the episodes, whatever they might be defined as, and to establish that whether data was taken, you know, if -- I'm not talking about every single burp, but if the major ones corresponded to some data, then at least there would be some sense that, you know, if you're talking about checklists, RWPs, that was working.

And we didn't do that, but that would seem to be an approach to say that, in practice, yes, I mean, certainly you would be expecting to see these kinds of things happening if there wasn't release in advance. They would have sent some of the workers over to be counted.

If they did not, then I'm sort of saying, okay, that dose was missed, but then if you were to apply some kind of coworker

model to that, the problem is that kind of event was missed and you don't have the workers. It kind of worked backwards in --

MR. MACIEVIC: The only thing we missed, it's a matter of -- if you've got the data from the incident --

MR. FITZGERALD: Right.

MR. MACIEVIC: -- and you have the actual mixed activation product data and things like that but somehow the health physics organization or the dose people -- the dosimetry group fumbled the ball and didn't do their part, the fact that you have the data, you could do a calculation from the data.

MR. FITZGERALD: Exactly. That's what I'm saying. So --

MR. MACIEVIC: You would not necessarily find it in the records for dosimetry.

MR. FITZGERALD: Right, right. And I think, you know, when you look at that

hit list that you have there, it's pretty clear that it's not reliable enough.

But the question is, is there any way to know? You know, if somebody says, you know, hey, I was at the plants and we had these burps every six months or something. I was exposed and I want credit for this. Just establishing this, in addition to who that person is and the exposure took place, to even get to the point where you could then assign, you know, some dose from the coworker to me would be a challenge. I don't know how you do that without --

DR. NETON: Coworker models are chronic-based models. They're not mission-based models. I think the approach was that, if you have a plutonium coworker model and you don't know if the person could have worked, say, with curium or something of that nature, you would assign an exposure to curium equivalent to the plutonium dose and

determine which one ended up with a more claimant-favorable dose to the organ that you're reconstructing. I mean, that I think is the approach in a nutshell.

And so we're saying we don't know. We don't know. It's either plutonium, which is more likely, but it could be curium. It could be americium by itself. And so which one of those inhalation exposures are going to give you a higher dose to the organ that developed cancer? That was the fundamental --

MR. FITZGERALD: But only event-driven. You're right on the chronic. Now, by definition, almost all of these are going to be event-driven.

DR. NETON: Right. But, see, that goes back to this original issue we had all along.

MR. FITZGERALD: Right.

DR. NETON: Is a chronic exposure model sufficiently adequate to bound the

events they may have had over time? A chronic exposure is a series of very closely approximated acute exposures. I think that's true. So if a person is routinely sampled for plutonium, it kind of covers all those incidents.

MR. FITZGERALD: Right.

DR. NETON: The question then is -- maybe it's a valid question -- were there more spurious events in these exotics than there could have been with the plutonium? I don't know.

MR. FITZGERALD: Certainly operationally, as you suggest, that would be more likely, although I think at LANSCE it happened probably more often than not. You know, it's sort of like before you get to all of the things that we're talking about, cesium 137 --

DR. NETON: Right.

MR. FITZGERALD: It kind of gets

down to looking at the RWP system that was in place.

DR. NETON: Yes.

MR. FITZGERALD: And from what you saw and from what you've seen --

DR. NETON: Yes.

MR. FITZGERALD: -- it's a very robust program, I mean, a very well matured program that would identify the hazard and put in place, at least on paper, the appropriate controls.

And it seemed to me that the potential for exposure to plutonium isn't just the sheer difference in the quantity of material processed and the nature of the way it's processed. It will generate a larger exposure potential than that for a smaller amount of material being handled.

And if you look at the RWP in a glove box under negative pressure, you know, all of those sorts of things, just by virtue

of that they were smaller operations, I think it's incumbent upon us to go back and describe that.

DR. NETON: Yes. I guess what I'm concerned about in talking to the dosimetrists at Los Alamos, anybody you talk to probably, is that, yes, you're a plutonium lab essentially. This is an accelerator over here with a short life.

You know, it's just great. You know, it just wasn't a big deal from an exposure setting, at least relatively speaking, and was just sort of a shrug, you know, yes, we probably would have seen it if we had caught it soon enough type of thing.

But we haven't found this DOE review and the fact that they weren't scripted to find it for some period of time -- it's not clear how long -- I think just walking down and validating whether or not this new robust system was actually being applied uniformly,

beyond the primaries, to things that certainly the HPs may have considered not a big deal would be very important because I think it's possible that because of the nature of the source terms at a glance, even though they were an exposure pathway, they might not have been sort of front and center to those kinds of controls and that kind of responsiveness.

And certainly one review as late as 2001 seems to suggest that it took DOE whacking the bioassay program and the in vivo program on the head to get their attention that they weren't doing what was prescribed in terms of monitoring LANSCE, being able to monitor LANSCE.

CHAIRMAN GRIFFON: Let me just ask, if we went to the who question more, how does one get assigned -- I mean, are there any cases from LANL for this time period that you are going to use individual dose data to get doses or is it all coworker-driven?

MR. MACIEVIC: From that period of time, we have -- do you mean do we have for individual --

CHAIRMAN GRIFFON: Yes, for individual dose reconstruction, are you --

MR. MACIEVIC: We have not used this, in as far as my talking with --

CHAIRMAN GRIFFON: Okay.

MR. MACIEVIC: -- Don Stewart, used this technique on anyone that they found yet to give this extra dose to the exotics in that case.

CHAIRMAN GRIFFON: Okay.

MR. MACIEVIC: Because we are also -- this is geared to the Class of the support workers in the lab, which in some of the discussion, it's for missed dose for that Class of people that is in there. If you are monitored and have the monitoring data there in sufficient quantity that you know you are going to use that data --

CHAIRMAN GRIFFON: Okay. So that is my question. So it's not for all workers?

MR. MACIEVIC: No.

CHAIRMAN GRIFFON: Certainly there are some who are going to use their own --

MR. MACIEVIC: Right. They're going to use what you have -- no. The thing that came up is with the security people, with the firefighters who go in periodically into a facility.

CHAIRMAN GRIFFON: Right.

MR. MACIEVIC: That might have had the exotics in it.

CHAIRMAN GRIFFON: Let me ask, out of that group of workers that you just -- the latter, describe them. How do you decide whether to apply the exotic exposures or not? Is it based on the actual checklist or --

MR. MACIEVIC: Yes.

CHAIRMAN GRIFFON: That level of detail? Whether they're signed into an area

or not, you'll --

MR. MACIEVIC: Well, we're not going to have in there the checklists for all of the people.

CHAIRMAN GRIFFON: No.

MR. MACIEVIC: But you will have an idea of where a person worked by the nature of what their activity was, like the firefighter or the --

CHAIRMAN GRIFFON: I know we have gone down this path before.

DR. NETON: My understanding, and maybe I'm wrong here, but I think the idea is that if a person was judged as having potential to be exposed to radionuclides like plutonium or anything that would tend to have them potentially exposed internally and there is no monitoring data, no one has to make a judgment, well, we would normally use the plutonium coworker model to assign that dose because they could have been exposed.

CHAIRMAN GRIFFON: Right.

DR. NETON: But there's also this combinant potential for exposure to these exotics.

CHAIRMAN GRIFFON: Right.

DR. NETON: So you thought first thing, determination, are you going to consider them a radiological worker, yes or no. If yes --

CHAIRMAN GRIFFON: That's one judgment, right. Right.

DR. NETON: -- is it the 50th percentile that would apply --

CHAIRMAN GRIFFON: Yes.

DR. NETON: -- or 95th percentile?

CHAIRMAN GRIFFON: Right.

DR. NETON: You make that decision. Let's say it comes out to 50th percentile. Then you have to say, okay. I would apply a plutonium model, but it could have been potentially exposed to these

exotics. Which of these chronic exposure scenarios would give me the highest dose to the organ that we're constructing?

CHAIRMAN GRIFFON: So based on what he could have been exposed to, these other exotics, based on what, a work history of where he worked in this building is what --

DR. NETON: I don't know that there's going to be that.

MR. MACIEVIC: If that's where the dose reconstructor -- you look at what the history of the person is, what they --

CHAIRMAN GRIFFON: What the job title is.

MR. MACIEVIC: The job title, the CATI discussions, the areas that the person would have worked in in the facilities. If they're working in a particular area most of the time that would have not had these radionuclides, you're not going to get --

CHAIRMAN GRIFFON: So where does

the use of the checklists and RWPs come into play other than to show that you -- go ahead.

DR. NETON: You have a decent radiological monitoring program.

CHAIRMAN GRIFFON: That's sort of what I --

DR. NETON: I don't think you could have that information. I mean, you sort of take it in totality, you can't work these in a vacuum.

CHAIRMAN GRIFFON: Right, right, right.

DR. NETON: The more information you have, the more finely tuned you could be. But clearly in cases where you have a minimal amount of information, you have no checklists, you have no RWPs, the person could have been exposed to plutonium, you're going to go with the highest, most claimant-favorable scenario you can come up with.

MR. MACIEVIC: And the checklists

are used also in determining --

DR. NETON: Big difference in what we do -- I'm sorry.

MR. MACIEVIC: No, no.

CHAIRMAN GRIFFON: You're not using to using it to make individual decisions on --

MR. MACIEVIC: No. They help you out in that when you have the checklist listed, they're going to be listing for different facilities and what the potential radionuclides were for those facilities because a person going in -- or you have a listing of all these checklists that they went through this. You will know the facilities that would have had these exotic radionuclides through that checklist.

CHAIRMAN GRIFFON: Have you summarized that in any way to match like here's Building 2's exotics?

MR. MACIEVIC: No, no. That's --

CHAIRMAN GRIFFON: That might be very useful for --

MR. MAKHIJANI: Mark?

CHAIRMAN GRIFFON: Yes?

MR. MAKHIJANI: This is Arjun. I had a question for Jim Neton, if I might?

CHAIRMAN GRIFFON: Yes. Go ahead, Arjun.

MR. MAKHIJANI: Jim, is there sort of a process by which you establish that, you know, the plutonium exposure conditions are similar in process or more claimant-favorable than whatever work was being done with something like curium when you applied it in other than quantities?

DR. NETON: That's a good question. That's what we just talked about, I think, a little while ago, Arjun.

MR. MAKHIJANI: You mentioned the quantities. I did hear that.

DR. NETON: Yes. I think there's

some benchmarking that needs to be done in that area.

MR. MAKHIJANI: Sorry?

DR. NETON: There's some benchmarking or validation, whatever you want to call it, that needs to be done in that area.

MR. MAKHIJANI: Oh, okay.

DR. NETON: We would agree with that.

MR. MAKHIJANI: All right.

CHAIRMAN GRIFFON: That's an action item, yes, yes.

DR. NETON: You're right because, I mean, there could have been different processes out there that wouldn't make this totally appropriate, but --

MR. MAKHIJANI: So it will be just like the cesium that you were just talking about?

DR. NETON: Exactly. That was the

second point I never got to. There were two. The cesium, the mixed fission, the activation product benchmarking as well as the cesium benchmarking for the mixed fission product and the benchmarking of the primary to exotics.

MR. MAKHIJANI: Okay. Thank you.

DR. NETON: I totally agree we need to provide all that.

CHAIRMAN GRIFFON: And on the question of use for activation product, the --

DR. NETON: Well, the activation products in general, what we are going to do there.

CHAIRMAN GRIFFON: Right, right.

DR. BUCHANAN: Okay.

MR. FITZGERALD: Before I lose this --

CHAIRMAN GRIFFON: Yes, yes. Go ahead.

MR. FITZGERALD: -- I thought -- I may have to go back and check here, but I

don't think the safety checklist as a, you know, systemic lab-wide application really got into force until later than 75. I thought it was maybe -- do you remember? I thought it was in the 80s.

MR. MACIEVIC: Seventies.

MR. FITZGERALD: Was it actually? Mid-70s. Okay.

MR. MACIEVIC: Which is why it's a --

MR. FITZGERALD: All right. Thank you.

DR. BUCHANAN: Okay. Yes. I had one clarification here, Jim. On the exotics, are you saying that, okay. One of my concerns was that if a person was going to be assigned an exotic dose or plutonium dose to see which was the highest he would be assigned -- that would be taken from the coworker's overall general laboratory bioassay data, like we see in OTIB- 0062.

DR. NETON: Right, correct.

DR. BUCHANAN: Okay. And are you saying that you're going to do, try to do some benchmarking to show that these exotics did not exceed the plutonium? Because what is bothering me is that if you have a plutonium intake over the whole lab and you've got one guy working with exotics over here, the plutonium-to-exotic ratio might not -- you might have very little plutonium but a lot of exotic if there's --

CHAIRMAN GRIFFON: That's what they've got to look at. That's what they've go to look at, yes.

DR. BUCHANAN: I want to clarify that.

DR. NETON: My feeling is that is probably not the case, but I am certainly --

CHAIRMAN GRIFFON: You've got to validate it, right, right.

DR. BUCHANAN: Okay. Thank you.

CHAIRMAN GRIFFON: Yes?

MEMBER PRESLEY: This is Bob Presley. I have a question. I would like to see something else added to that, and that's the dates.

Should we not -- when we go in and look at these things, there are certain areas that the dates of projects were done in certain areas and the dates that the areas were cleaned up and projects and the materials were gotten out of them.

Would it not help to go back in and look at some of this stuff by date, too, as to where it was done and what was done in that area?

MR. MACIEVIC: That should be part of it, yes. I mean, it should be with the data itself. So yes, the --

DR. NETON: Part of the problem is, as I think it said in the report, there are some 100 problems in these health physics

records. I mean, how far are we going to need to go through these? I mean, at some point --

CHAIRMAN GRIFFON: Right.

DR. NETON: I don't know what level of --

MR. MACIEVIC: And that's one of the things I'm doing right now is I've got an Access database that I'm developing to take all of the surveys of the data capture data, go through all those reports, break the reports out, to talk about such things as the RWPs, the checklists, and other information to put it in so you can get the kind of picture you want to see --

CHAIRMAN GRIFFON: Right.

MR. MACIEVIC: -- so that you can go over time, see what kind of things are being looked at, what period of time were they covered hard-core, and where is the lightest to where are they now. Everything is being looked at.

CHAIRMAN GRIFFON: I see. I can remember previous Work Groups where we have had -- I'm trying to think of -- you know, Mound is an obvious example, but, yet, a good starting point there with the Wayne King stuff, right? I mean, it was the table of the --

MEMBER BEACH: The roadmap?

CHAIRMAN GRIFFON: Yes, the roadmap, the roadmap.

DR. NETON: Part of the problem with this is you get into these later years where, if the protections that were in place were pretty solid, the absence of bioassay samples doesn't necessarily mean much.

CHAIRMAN GRIFFON: Right.

MR. MACIEVIC: I mean, you don't use people as human air samplers, obviously. And if they had CAMs in place and breathing zoners and the whole nine yards and nothing shows up in any of those workplace indicators,

you might not have a bioassay program necessarily.

CHAIRMAN GRIFFON: There is certainly a reduced one, yes.

MR. MACIEVIC: A reduced one. You've got to look at it in that context. I think that is what we are trying to say here. This program appeared to have some pretty --

MR. STEWART: This is Don Stewart.

I would just point out that with respect to corrosion and activation products as well, the first line of defense there, of course, is the paper filter, where you take samples of the ambient contamination levels.

DR. NETON: And it may be that there was airborne activation products, but it resulted in a dose needing so many millirem or whatever, especially in this era. We're not likely to see any kind of bioassay.

DR. BUCHANAN: Just as a general comment -- this is Ron -- did you find when

you looked at Los Alamos bioassay data, that it decreased sharply in the 1990s?

MR. MACIEVIC: Let me ask Liz on that one since she did a lot of the analysis. I can say from the external dosimetries that what you do see is that in looking at, even at this data, where you talk about the beginning lithium fluoride dosimeter that they use with the MPA, what you end up seeing is that the neutron doses they go up.

And the dose in general for sites will then start to peak out as the Cold War period goes -- like in the 89-90 period. And the doses when they get into more of the cleanup, they start dropping off tremendously.

So I would bet that is how this data is going to be is that you're going to see this like in the early years, it goes up, comes up. And as you start going out into later periods, the data is going to drop down, number of surveys done goes down because now

the site's doing more restricted work. The whole site got better containment controls and that.

Liz, can you address that?

MS. BRACKETT: I don't recall. I think Bob Burns might be a better person. He's the one who last worked on the document that summarizes the data in the database that we have.

MR. MACIEVIC: That's not a good response.

MR. BURNS: The external data in the database?

MR. MACIEVIC: Well, I rambled off into the external, but he's talking about the --

DR. BUCHANAN: Bioassay seemed to decrease rapidly in the 1990s at Los Alamos. And I was wondering, did you see that same picture, and did you have an explanation for it?

MR. BURNS: I don't have an explanation. Those are the data as provided. I guess there could be additional data but probably not. That probably just reflects the nature of the work and the nature of their monitoring program, is my guess. But we need to look into that to say something more confirmatory.

DR. MAURO: This is John Mauro.

CHAIRMAN GRIFFON: I think this is what we have seen at a lot of sites, yes.

DR. MAURO: Jim, as it relates to -- this is really an over-arching suggestion. When we review your coworker models and we're making a judgment of data adequacy and completeness, as you know, we look at the bioassay data, for example, as a function of any facility now, as a function of time and also as a function of different campaigns, different buildings.

And very often you may have a lot

of data, but when we start to sort the data, we find that, well, there were certain time periods and certain buildings, for example, where there's a paucity of bioassay data, let's say uranium bioassay as the simplest example.

And one of the things that we often look for -- and this goes to what we're talking about right now -- is if you could make an argument, you're making an argument very often that, well, one argument is process knowledge. Well, we know -- and when you get into this time period, this particular building, there really, really wasn't very much of this type of activity going on.

I would say that that is certainly one line of argument to say that the fact that we don't have a lot of data for that time period for that location and, therefore, any coworker model would bound that, but I would go a step further: that you could make that

case, but you had mentioned air sampling data.

One of the things I have not noticed that applies here but applies many other places is, if you also have air sampling data that is sort of just part of the routine and you could show that the levels of the airborne activity, even though it may be a general area monitor -- I realize, you know -- where you could see that we're just not seeing the airborne activity there in those years at those locations or if we are seeing anything, it's really well below the levels we're seeing at other locations, you start to build the weight of evidence why it's okay.

CHAIRMAN GRIFFON: Yes, supports the argument.

DR. MAURO: I have not seen that. And I think that could go a long way to building the basis for your coworker models.

DR. NETON: Yes. I hear you, John. That's a good suggestion. I don't have

a sense for how difficult it is going to be to obtain all of those values and look at it. And then if we pull a representative sample, then the question is going to be, well, did you pull enough?

CHAIRMAN GRIFFON: Yes.

DR. NETON: So we need to go back and look at that, though, and talk amongst ourselves. I've learned not to make commitments without talking to the -- that really know the data. But I 100-percent agree with you there.

Getting back to the 1990s, though, it seems to me that that was in 1992, when 10 CFR 835 came into place, where you had to only monitor -- the requirement was that you had to monitor workers who had the potential to receive 100 millirem exposure annually, and I think that was CEDE.

CHAIRMAN GRIFFON: Yes.

DR. NETON: So there's a lot of

people went and reevaluated their bioassay programs during that era and particularly since 835 was -- I don't know about Los Alamos, but it was at least commercially punishable by civil and criminal penalties if you violated it.

So I have a sense that they must have reevaluated the need for the monitoring programs if --

DR. BUCHANAN: But there was sufficient bioassay data to extend that. You stated that OTIB-0062 was brought up to date to 05.

CHAIRMAN GRIFFON: Yes, right.

DR. BUCHANAN: There was sufficient bioassay data --

MR. MACIEVIC: Yes.

DR. BUCHANAN: -- to create that. Now we have not seen, one of the things in our report here, is that we have not seen -- there were intervals, like five-year

intervals, to take us from OTIB-0063 to OTIB-0062. And so it appears in three- or four- or five-year intervals. We have not seen the data on a yearly basis to determine if there were any years that were missing or anything.

Would it be a reasonable thing to provide us with what the yearly data was to create OTIB- 0062? Because, you know, like I say, they were like three- to five-year intervals. Is that somewhere available that wouldn't be a major undertaking to provide that information? That was a point made in our report.

MR. MACIEVIC: I wouldn't think that would be a big thing, but, as Jim has said, we'll take a look and see what exactly we've got there.

DR. BUCHANAN: Yes.

MR. MACIEVIC: But I don't think that would be a problem to break that out by

year.

DR. BUCHANAN: Just so that we know there was adequate information for each time period.

CHAIRMAN GRIFFON: Okay. This might be a good break point.

DR. BUCHANAN: Yes.

CHAIRMAN GRIFFON: I say we take a ten-minute break. Is somebody on the phone asking?

MR. KATZ: No.

CHAIRMAN GRIFFON: Let's take 10 to 15 minutes. And when we come back, I'm going to try to summarize actions. I think we covered, like, the first two topics, really.

MEMBER BEACH: First three. Three.

MR. FITZGERALD: Yes. You're right, three, because coworkers are, yes.

CHAIRMAN GRIFFON: Coworkers up there, right. I'll try to summarize the

actions because I get a little -- yes, a lot of things are flowing around. So we'll try to summarize when we come back. So take 15 minutes on the phone, and we'll come back.

MR. KATZ: Okay. Around 11:15, then, Eastern time, folks on the phone.

MEMBER MUNN: Thank you.

(Whereupon, the above-entitled matter went off the record at 11:03 a.m. and resumed at 11:18 a.m.)

MR. KATZ: We're starting back up after a short break. Ted Katz. Advisory Board on Radiation and Worker Health. It's the Los Alamos National Lab Working Group.

Let me just check and see. Wanda, are you with us? Wanda Munn?

(No response.)

MR. KATZ: Okay. Well, we may have some phone stragglers.

CHAIRMAN GRIFFON: All right. I just wanted to take a few minutes to summarize

the actions and went over them a little during the break. But what I have is -- the first one is this benchmarking question or validation question for both the exotics to the primary nuclides and also the cesium to the mixed fission product. So that's the --

DR. BUCHANAN: Activation products.

CHAIRMAN GRIFFON: -- fission products. And then the second part is using the cesium at all for the mixed activation products.

DR. BUCHANAN: Okay. Okay.

CHAIRMAN GRIFFON: Yes. I kind of broke it out that way.

DR. BUCHANAN: Okay.

CHAIRMAN GRIFFON: Yes. They're all related there.

The next item was a better description of the episodic nature of exposures to exotics and the mixed activation

and fission products. And I think Joe sort of raised that as a, do you have a sense of these events. Is that what you were looking for, Joe, when you --

MR. FITZGERALD: Well, yes. I think the notion there was if, in fact, the monitoring practices and just the control practices improved quite a bit mid-70s. Can you see evidence of being able to see events occurring knowing that they were occurring and at least being able to know who might have been involved and that kind of thing?

I agree with what Greg was saying. It doesn't necessarily mean you always see a bioassay.

CHAIRMAN GRIFFON: Right, right.

MR. FITZGERALD: But you would see certainly that because of the site checklist, whatever, there would be some awareness of --

CHAIRMAN GRIFFON: Okay. Then that may be tied in with this. I separated

these, but I think these go together, which is a demonstration that there was a more robust system in place. So I think they are one and the same, those two items, just the -- and --

MEMBER PRESLEY: Mark?

CHAIRMAN GRIFFON: -- again, that --

MR. MACIEVIC: -- start showing that, you'll be showing --

CHAIRMAN GRIFFON: Right, right. And I think that gets back to -- I mean, certainly my opinion is you guys build your case on that. And like Jim did say, you know, sometimes we'll come back with six or seven, ten reports. And a worker might say, we want to see 40.

I think it might be a little iterative, but, you know, I think just take your best stab at that the first time through.

MEMBER PRESLEY: Mark, this is Bob Presley.

That's about the time that DOE came out with new orders on industrial hygiene and rad safety and stuff like that and the overall program for all the design labs and the manufacturing facilities really started getting tighter. I think you'll find that.

CHAIRMAN GRIFFON: Right. I think we definitely have that sense. And we just wanted to sort of validate that it was actually, you know, not only in paper but in principle working.

And like Joe was saying, there might be -- sometimes there is a lag between --

MR. FITZGERALD: A transition time.

CHAIRMAN GRIFFON: Yes.

MR. FITZGERALD: I agree it was a transition time, but you had a pretty established culture. So the question in my mind was in practice, did they actually change

their spots as quickly as the procedures and program and descriptions suggest or not? And can you find some way to characterize that to validate --

MEMBER PRESLEY: Evolution.

MR. FITZGERALD: Well, yes.

CHAIRMAN GRIFFON: Yes.

MR. FITZGERALD: And I think we can agree that Los Alamos was one of the more stubborn sites, so I just, you know, sort of healthy skepticism.

CHAIRMAN GRIFFON: Okay. The next item was one that I sort of brought up. And I think Bob also mentioned the yearly information, providing a matrix of some sort to show sort of cross-walking this information on the checklist RWPs, the idea of -- you had exotics and mixed fission products in certain areas.

So can you sort of lay that out in a matrix, the areas these things were likely

in over certain time frames, too? You know, certain campaigns might have ended by the 1980s or whatever. So I think that was as well. So location and time frames for --

MEMBER PRESLEY: This is the early 90s.

CHAIRMAN GRIFFON: Yes, yes. And I think you have already been working on the database. Hopefully there will be something that you could pull out of your work.

The next item I have was to look at the -- if what Ron was indicating is true, it seems to be that the bioassay dropped off in around 1990. And can you justify why that was happening?

And, again, it might have been the implementation of 835. So if you would just have an explanation for why the drop-off and what was the change in practice at that time?

MS. BRACKETT: Mark? This is Liz Brackett.

CHAIRMAN GRIFFON: Liz might have an answer now.

MS. BRACKETT: Yes. I looked this up during the break, and there was not a drop-off. For plutonium there's -- up through 2008, there are still more than 2,000 samples a year collected. And there's nothing really much higher than that.

Uranium was a little bit lower but not a significant drop. It's still in the six to eight hundred samples per year.

CHAIRMAN GRIFFON: Okay. So I am going to turn that back to SC&A and ask them to look further at -- maybe it's --

DR. BUCHANAN: Okay. The data I took from was what they supplied. But I can look at that and send you the plot. I don't know if I have it. I might be able to find it --

CHAIRMAN GRIFFON: Okay.

DR. BUCHANAN: -- by the end of

the meeting.

MR. FITZGERALD: There was nothing in the report that was actually sent in.

CHAIRMAN GRIFFON: This may also dovetail into the next one, which is Ron's request for yearly breakout of the OTIB-0062 coworker data. OTIB-0062 relates to which coworker model --

DR. BUCHANAN: Well, that's the plutonium, the primary.

CHAIRMAN GRIFFON: The primary. Right, right, right.

DR. BUCHANAN: Cesium-137.

CHAIRMAN GRIFFON: So if you get that annual breakout, you'll have another -- that data now extends up to 2005. So I don't know. Maybe you'll be able to reassess that in --

DR. BUCHANAN: Right, right.

CHAIRMAN GRIFFON: Anyway, I'll --

DR. BUCHANAN: I'll get back with

them on that comment, then.

CHAIRMAN GRIFFON: Yes. I'll leave that as SC&A can look into that as well.

DR. BUCHANAN: Right.

CHAIRMAN GRIFFON: So thank you, Liz.

MS. BRACKETT: You're welcome.

CHAIRMAN GRIFFON: And the last one I have was what John Mauro mentioned, investigate -- and I think it's careful, the phrasing here -- investigate whether air sampling or other data might be available to sort of demonstrate the magnitude of some of these exposures, especially the mixed fission products, mixed activation products.

You know, in other words, if you don't have bioassay but you have a lot of air sampling data indicating that there is very little exposure, it's just another weight of the evidence that demonstrates that.

MR. MACIEVIC: That's one of the

things that you will see is that during this period because there wasn't a lot of it, there's not going to be a lot of monitoring data for those particular things and --

CHAIRMAN GRIFFON: Right, right, right. So yes, there may not be a lot, but if there's some, it might be another piece of the puzzle that it would help us --

MR. MACIEVIC: Exactly.

CHAIRMAN GRIFFON: Yes. And I don't, like I said, investigate whether -- I don't expect, you know, extensive pulling of data and trying to build a database out of this. I think the first step is to see how much is out there and maybe give us a flavor of what is there and what you found as far as levels as a result.

And that is the items that I had for actions. I think I captured --

MR. FITZGERALD: Just one additional item. I mean, we talked about it,

but I don't know if we -- you know, the in vivo technology, the counter figures in the evaluation report.

I was a little unsettled to find, again, this DOE finding as late as 2001 that the capabilities to actually even use or do the counting for LANSCE and for thorium-232, at least those two examples, wasn't available to Los Alamos.

I mean, even though it was required, this finding -- and I have the memo here if anyone wants to look at it -- this finding by the Albuquerque operations office was that the in vivo program wasn't doing it, didn't have the capability, and was required to have it.

Now what Jim was saying earlier, I think this was event-driven. I mean, clearly they were not claiming that there were people being exposed and they weren't being monitored. What they were saying was the

capability wasn't being maintained by the in vivo program.

And what was recommended was they needed to get together with the bioassay evaluation program and reach an agreement that those expectations would be conveyed and that they, in fact, would maintain a capability.

So, you know, this whole thing of the technology does figure, I think, as part of this weight of evidence, I think, better.

CHAIRMAN GRIFFON: Right.

MR. FITZGERALD: But this is a little bit unsettling that as late as that date, they weren't maintaining the capability. So one thing I think would be helpful -- and I was just joking with Greg.

You know, you sort of don't want to dive in at Los Alamos and try to -- you know, this was 2001. It would be useful to know. Did they maintain the capability to be able to in vivo count? Were they calibrated

to do that for LANSCE, going back in time?

I mean, maybe it was just something that they dropped in the cracks, and it was kind of a little trouble, you drop in the cracks, but -- drop in the cracks in the late 90s, and they were dinged in 2001 and restored it.

I would be worried that, maybe, how long did they not have that capability.

CHAIRMAN GRIFFON: Yes. Were they not maintaining it then --

MR. MACIEVIC: Let's look at all of it because we had talked to them. In talking with them, the idea is that they did have capabilities but they didn't apply them basically in our talking --

MR. FITZGERALD: Well, this says they didn't have capability because they didn't calibrate their -- they didn't have the reference.

MR. MACIEVIC: Yes, but it wasn't

calibrated but that the material itself, the counters itself --

MR. FITZGERALD: Right.

MR. MACIEVIC: -- would have seen any stray radionuclides that would have been out of the ordinary and do it. They don't say they were calibrated to it and working at it. But that if it was something unusual in the spectrum, they would have been able to see it.

MR. FITZGERALD: Yes. But I guess my concern would be that -- and I talked the same. I got the same answers. So I am not disagreeing with you on that sense from them.

This was actually -- they were required to maintain that capability if, in fact, for example -- thorium-232, an operation came about, they would do it. That is less troublesome because I think they weren't doing 232. So it's no big deal.

But for LANSCE, which is continually operating, to sort of not have the

capability because they didn't get the calibrations, what have you, that is unsettling because then you sort of say, well, you're required to do it and you're not doing it.

If there were some people sent over, for example, to be run through, unless somebody said, well, wait a minute. We don't have that, we have to go over and get that, it wouldn't be picked up necessarily unless somebody was really looking for it.

So I'm just saying that, you know, we didn't really go through and systematically establish whether their library references were kept up to date and whether they, in fact, were doing it.

What they told me in interviews was that we have the technology that would see it, but it's rare. And if it came out, we would find it. It's just kind of fuzzy.

MR. MACIEVIC: Sure. And, well,

the thing is, is I, in my approach in looking at some of these problems, I'm not looking at the dosimetry people as much as in the field if someone has measured something.

And if the dosimetry people screwed up and didn't bother with something, we need to show that if it occurred, that our model will fit what occurred with the numbers that we see if there is monitoring data to show something and that us applying our technique to it will cover it, that that is okay.

And if you don't find the data, like --

MR. FITZGERALD: Yes. What you are saying is upstream.

MR. MACIEVIC: That's right, that if they missed it or didn't bother to compute it, that to me is not as bothersome as if there is nothing at all that you can see something happening or you can show something

was not happening or however you are going to prove it. But if the dosimetry people didn't catch it, that's another matter altogether.

MR. FITZGERALD: Well, again, we're just saying that, you know, certainly as weight of evidence the technology figured in this time frame. I'm not saying this is conclusionary. I'm just saying sort of -- well, it raises sort of the question about --

CHAIRMAN GRIFFON: Or maybe it was an --

MR. MACIEVIC: Exactly.

MR. FITZGERALD: -- what the practice was that --

DR. NETON: I would like to get a copy of --

CHAIRMAN GRIFFON: That's what I was going to say. Maybe as an action I can --

MR. FITZGERALD: That's an excerpt. I mean, I made copies of relevant pages but I have the whole thing.

DR. NETON: I'm looking at it. For instance, the thorium-232, it should be noted at this time there are no personnel who've been identified -- requiring routine monitoring for thorium.

MR. FITZGERALD: Right.

DR. NETON: They're basically saying, in case it happens, you should be ready.

CHAIRMAN GRIFFON: Right.

DR. NETON: And they had all the appropriate phantoms, equipment. They just didn't feel the need at this time to have it.

MR. FITZGERALD: Maintain it.

DR. NETON: That's sort of a preparedness issue, as opposed to a --

MR. FITZGERALD: I agree with you on 232, but there's --

DR. NETON: LANSCE wanted 232 to be a little more of an issue, where they weren't aware of what the -- you know, they

didn't have an idea of what the potential radionuclide of exposure were at LANSCE. With thorium I think I --

MR. FITZGERALD: I agree with you on thorium. I just found it unsettling that for LANSCE, which, you know, I think as -- if you're an internal dosimetrist, I mean, you know where you're going to see something. And not to be aware of potential nuclides at LANSCE, I would have to wonder what happened on that one.

DR. NETON: And Greg is absolutely right. Most of these systems are a peak search-driven routine where a good internal dosimetrist would look for depending on -- unidentified peaks would show up in part of doing an investigation.

You would have a giant peak for manganese-54 popping up there and say, well, I saw a peak. I have no idea what it was.

MEMBER MUNN: Joe, this is Wanda.

Have you shared that with -- have you shared that document with the Work Group? Is that another thing I have missed?

MR. FITZGERALD: Well, I'm sorry. We referenced it and discuss it in the report. I have an excerpt here.

MEMBER MUNN: Well, I heard the discussion.

CHAIRMAN GRIFFON: Actually, none of us has it, Wanda, other than Joe.

MR. FITZGERALD: Yes. Like I said, it's discussed in the report and it's referenced.

CHAIRMAN GRIFFON: Is this something in the -- I mean, we can circulate this or --

MR. FITZGERALD: This is a DOE memorandum. So it's a public memorandum, yes.

CHAIRMAN GRIFFON: Maybe you can make it available to everyone, and NIOSH can push it on the O: drive, yes. That would be

great.

MEMBER MUNN: That would be nice.

MR. FITZGERALD: The relevant piece is that which you've quoted.

CHAIRMAN GRIFFON: Right.

MR. FITZGERALD: So it's about one paragraph, which is one of the findings that here are two things you missed, no big deal, on thorium-232. We're not doing anything. But then the LANSCE part is a little --

CHAIRMAN GRIFFON: Yes. I think you're right. Yes. So I just have that NIOSH will look into that question of the in vivo capabilities being maintained and vis-a-vis the 2001 audit report. Okay.

Any other items on the -- I think we covered the first two. We sort of touched on the third big issue, which is the coworker stuff, but I think I had a couple of questions on that, too.

MR. STEWART: This is Don Stewart.

I just had one thing I would like to put in the record that goes back to our earlier discussions and that is that I am going to summarize some sample dose reconstructions that we did for people who may not have been involved in this project.

What happened is we evaluated these so-called exotics -- and I will list them for you -- in some dose reconstructions where we reconstructed doses to various organs using the coworker dose intakes and this is kind of a proof-of-concept exercise for our exotics approach for the ER.

So what we did is we looked at actinium-227; protactinium-231; curium-244; californium-252; neptunium-237; thorium-230; plutonium-238, which really isn't an exotic; and then we also compared that with our models for plutonium- 239.

People who are familiar with our practices have no doubt heard about our

assumptions for highly insoluble plutonium. What we have done is we have acknowledged that the type S model may not model all plutonium behavior within the complex. So we developed some dose modification factors for plutonium type S bioassay that increases the dose to model what is commonly called Super type S.

We routinely evaluate cases for applicability of Super type S. And in the dose reconstruction process, applicability may be based upon what results in the higher dose. In fact, that is usually the case, as people will bear me out, I think. Rather than looking at a possible absorption type based on workplace considerations, we'll simply apply the most claimant-favorable dose.

This helps us in our approach of overestimating all of the doses that we can for non-compensable claims. And, of course, we also have the option to underestimate compensable claims.

A little bit of background there, but what we found was when we took the same intake for each one of these radionuclides, of those, type Super S plutonium was limiting in most cases, was limiting for all non-systemic organs. So the one that came closest was actinium-227, but those doses are still a small fraction of the type Super S dose, which we would routinely apply in most cases.

For some of the systemic organs, actinium- 227 was slightly larger than the type Super S dose, specifically the bone, red bone marrow, and liver. The difference was not huge in this case.

Actinium-227 is one of those that we can limit to a certain extent by facility and time frame. I think people are mostly aware that it was a hazard at Los Alamos in the early days when it was used for atomic weapons initiators, but that program closed out in the mid-50s.

I just wanted to get that in the record that, when we talk about exotics, we typically already apply a bounding model and that is a plutonium, highly insoluble plutonium, model.

CHAIRMAN GRIFFON: Thank you, Don.

Yes. That's a question I was going to ask, if SC&A reviewed these. All of those are in your cases, right, that you provided along with the ER evaluation?

MR. FITZGERALD: Sampling of 30 cases, which is as far as I think we thought we should go at this stage to try to get a representative sampling of --

CHAIRMAN GRIFFON: But SC&A looked at these sample dose reconstructions that he's talking about?

MR. FITZGERALD: Oh, the sample dose reconstructions? Not the sample.

CHAIRMAN GRIFFON: No. No. That's what I'm asking. I think you should.

That's an action item that I just put for you.

And, Don, are those --

MR. STEWART: These are dated December 2008.

CHAIRMAN GRIFFON: Okay. So those are available on the O: drive, I imagine, right? They usually are. All right. So that's --

DR. BUCHANAN: How many cases were there, Don?

MR. STEWART: Well, it's not discrete cases necessarily. We have some summaries. I'd have to go back and actually look at the data that we posted up there. What I did was for my own reference put together a table, just to see what the doses were.

CHAIRMAN GRIFFON: Okay. All right. If we can't find it, we'll get back to you.

MR. FITZGERALD: Yes. If we could

get the reference location on the O: drive, that would be really helpful, make sure we --

DR. BUCHANAN: It would be under Los Alamos.

CHAIRMAN GRIFFON: It should be under the LANL folder, right?

MR. FITZGERALD: Well, just make sure we have that --

CHAIRMAN GRIFFON: Yes. All right.

MEMBER MUNN: But that bears very directly on the question that I was asking earlier so thank you, Don. I appreciate it. I thought I remembered seeing something at some time, but it's been a long time since we've visited this.

MR. STEWART: You're very welcome.

CHAIRMAN GRIFFON: I think that takes us through 1 and 2. Ron or Joe, if you have other things that we are missing?

MR. FITZGERALD: I think -- no.

I've heard a lot as well, but I think, actually, 3 was more on the coworker model.

CHAIRMAN GRIFFON: Yes, 3 --

MR. FITZGERALD: We had spent --

CHAIRMAN GRIFFON: Three I wanted to stop for a second at least to --

MR. FITZGERALD: All right. That certainly is 1 and 2, yes, sir.

CHAIRMAN GRIFFON: And maybe you can just -- I'll turn this over to you, but the one question I had on 3 was -- SC&A, it seems like you reviewed and found that there appeared to be sufficiently accurate bioassay data available for primary radionuclides. But you say with some qualifications, so I wondered. You know, that phrase caught my eye.

DR. BUCHANAN: Okay.

CHAIRMAN GRIFFON: I just wanted to hear what you have done on your review of that.

DR. BUCHANAN: Okay. This is Ron.

Yes. The qualification we discussed in that -- the two qualification points that I wanted was what happens after 88 and they've addressed that. They now have it available up to 05.

CHAIRMAN GRIFFON: Right.

DR. BUCHANAN: So that's not an issue. And then the other was the yearly. Instead of intervals, what's the yearly data points? And he said he would -- could supply that. And so those two qualifications have been addressed.

CHAIRMAN GRIFFON: Have we -- I don't know that -- I mean, as the Board's SEC review policy -- you know, we talk about the data, the quality of the data. And from the standpoint of, sort of, validation and verification, did you look at all at the database data compared to any hard-record data or is there any available even? I don't even

know.

DR. BUCHANAN: No, SC&A did not perform --

CHAIRMAN GRIFFON: You didn't go down that path, right?

DR. BUCHANAN: Right. No, we didn't. We had not went down that path yet. On just a preliminary basis, I looked for validation and verification indications. And the documents that I looked at indicated -- and it's in my summary sheet in the appendix. I listed -- on those charts I listed some of the validation and verification that was done that I found in the literature.

SC&A did not do any of their own validation, like we did some at Mound and stuff. We did none for Los Alamos. I simply summarized where I'd seen statements concerning validation and verification. I listed them as, you know, they validated so many log books and then found a certain

percentage and that sort of thing, but we did not perform any ourselves.

CHAIRMAN GRIFFON: But NIOSH did do --

MR. FITZGERALD: Well, NIOSH did it --

CHAIRMAN GRIFFON: Right.

MR. FITZGERALD: -- because this was the most recent compilation over the last several years as part of that process of working with the lab. The V&V was done in conjunction with putting that -- I mean, literally putting the database together.

MR. MACIEVIC: That was much earlier.

MR. FITZGERALD: Now this was a question that was raised earlier -- I can't remember the gentleman's name -- on the first SEC. This guy is now in Oak Ridge.

MR. EVASKOVICH: Silver? Ken Silver?

MR. FITZGERALD: I know there was a question certainly whether the verification and validation of the data was adequate for data going back into time. But this is a slightly different issue, which is the most recent database compilation that was put together on the bioassay, whether the V&V -- we looked at that and haven't independently validated and verified the V&V that was done, but certainly that was done recently on this latest compilation.

So the question for the Work Group is whether we would want to actually do an independent V&V of the V&V that was done on this database that was put together in conjunction with the lab.

We didn't see it as a priority per se, but I think the issues that we thought were most prominent on this latter SEC period were the ones we just discussed.

CHAIRMAN GRIFFON: Yes. I didn't

realize that this was a database that was constructed recently. So it's --

MR. FITZGERALD: Yes, it is.

CHAIRMAN GRIFFON: So it was pulled from hard copy data and constructed from the ground --

MR. FITZGERALD: Log books as well. And V&V was done -- V&V was done in conjunction, putting that together recently. So it's a little different issue than we traditionally get into, which is going back into time. This is a relatively recent pedigree. And it was just done.

We looked at the process that was done. And it was, in fact, done, but it's up to the Work Group whether there is any need to --

CHAIRMAN GRIFFON: Was there any comparison? I mean, I admit that I haven't looked at this, but was there any comparison of, as this was being put together, the log

book information going into the database?

I think you mentioned earlier that the individual claims have records of their own. Would they have -- has there been any comparison of those? Would they be a different data -- I don't -- they might be coming from the same exact source. I don't know.

MR. MACIEVIC: I can't say right off the top of my head.

CHAIRMAN GRIFFON: That would be my one question. I'm not necessarily tasking SC&A. Maybe if we can find that out? If not, I should --

MR. FITZGERALD: When we interviewed at Los Alamos and talked to the internal dosimetrists that worked on the database, that was one of the questions we had as to what extent they validated that the log book data was matching up with the bioassay. Sort of that process.

CHAIRMAN GRIFFON: Right.

MR. FITZGERALD: And certainly we were told it was done in conjunction with the NIOSH -- I can't remember the NIOSH person that was there but working hand in glove with the NIOSH individual. That was one of the issues, was to make sure that that was validated.

So from that standpoint, got feedback that they did -- apparently did a rigorous job. But, again --

CHAIRMAN GRIFFON: I guess I am asking you if the log book had, you know, Joe Smith -- bioassay sample, and then you pulled Joe Smith's claim and you have a different number for that time, you know, that's my question to you.

DR. BUCHANAN: It all ended up in the Los Alamos bioassay repository.

CHAIRMAN GRIFFON: Yes.

DR. BUCHANAN: And that is the

main database they're using now.

CHAIRMAN GRIFFON: Right. So it's the same records that --

DR. NETON: Our claimant data is coming out of the --

CHAIRMAN GRIFFON: You're comparing the same source, yes.

MR. FITZGERALD: Same source.

DR. BUCHANAN: And there was verification from the log book to some of that and they give percentages and stuff. I'm trying to see where I read that. I thought I had summarized it.

MR. FITZGERALD: It is summarized in the --

DR. BUCHANAN: Yes. I think it is summarized somewhere in here.

MR. FITZGERALD: In our review.

DR. BUCHANAN: In our review.

MR. FITZGERALD: Yes, it is.

MEMBER BEACH: I remember reading

it, too.

DR. BUCHANAN: And so there was -- and they can speak to it better that I can. SC&A understands that there was verification from the log book to the present database which is used for DR. And as it got further later in time, more present, it was better and better.

The original -- any differences was like maybe with non-dose data, you know, like Z numbers and that sort of thing, not things that would affect the dose reconstruction.

MR. FITZGERALD: Now here on --

CHAIRMAN GRIFFON: The coworker model --

MR. FITZGERALD: -- page 17 of our report, we quote what was done on verification and validation. And I think the only question that we raised, which is at the very end of this on 17, page 17, was for the early part of

the relevant SEC period question, the 70s to the 90s, it should be clarified by NIOSH what V&V, verification and validation, has been accomplished for the radionuclides in question, particularly for the mixed activation, mixed fission products and the exotics.

So, you know, certainly the V&V that was done was done for the whole shooting match, including plutonium and whatnot, but I think the question we had was just going specific to the exotics; was that data validated as well?

CHAIRMAN GRIFFON: So that question remains, but the other -- I think you answered my -- at least for now I'm satisfied with -- I didn't understand that it was constructed from the ground up on this.

MR. FITZGERALD: Yes.

CHAIRMAN GRIFFON: And it sounds like --

MR. FITZGERALD: It's pretty extensive.

CHAIRMAN GRIFFON: It sounds like the records in the individual files are the same ones that you used to build the database, so there's no sense --

MR. FITZGERALD: Right.

CHAIRMAN GRIFFON: -- really comparing yet.

DR. NETON: When we found them, originally as found, these databases were all over the place. There were several different ones. And they were not really matching. So we invested a fair amount of effort to --

CHAIRMAN GRIFFON: Okay.

MR. FITZGERALD: And we spent a lot of time talking to the people that actually worked with NIOSH to understand better the lengths they went to to extract this information. And they did a lot of validation against log books, pulled

information from Jim Lawrence's log books. So it really sounded pretty comprehensive. It was all over the place, and that was the process of pulling it together.

CHAIRMAN GRIFFON: So the only outstanding action, then, really, to come away from this is the question on the exotics. Right, Joe? Is that --

MR. FITZGERALD: Well, then there's a matter -- we certainly had this information. And we got from the people at Los Alamos the sense that it was pretty comprehensive and rigorous.

But every time we got to the exotics -- understandably, this is a small sliver. And most of this was plutonium data, the americium data, and you're asking them almost half a percent.

CHAIRMAN GRIFFON: Right.

MR. FITZGERALD: And no one really had a good answer as to how good that data was

and are you comfortable or confident about it. So that was the lingering question we had since we were really focused on this -- sort of the tail on the dog more or less -- is this data good data. The same questions we have been asking.

CHAIRMAN GRIFFON: Right, right.

MR. FITZGERALD: Is this data good data, and how do you know it's good data?

CHAIRMAN GRIFFON: Yes.

MR. FITZGERALD: And if we were to -- wanted to look at V&V, I would say no. I don't think it would be worthwhile to look at the whole shooting match. I think that looks like a rigorous process, but it would be useful to know if there's any way to validate what we do have.

And some of this is log books for these exotics. It's not necessarily in the printouts. It's somewhat in the log books, but is that data good data?

DR. BUCHANAN: But it won't do any good if we're not going to use it. You know, if we're not going to use the data --

CHAIRMAN GRIFFON: That really goes back more to the benchmarking, you know, is the other --

MR. FITZGERALD: Which is one reason the --

CHAIRMAN GRIFFON: Are the primary models still bounding? Yes.

MR. FITZGERALD: We can put that in there, but the emphasis is still on the questions we just covered, which is really where the action is, so to speak, on this.

CHAIRMAN GRIFFON: Right. I agree. So that doesn't --

MR. FITZGERALD: So yes. In a way, we almost involved the --

CHAIRMAN GRIFFON: Sort of the same --

MR. FITZGERALD: -- started with

the validation, the pedigree of the data first. In this case, it's almost because of the history. In fact, it was just put together in what was done. It seemed like these other questions were actually more paramount.

CHAIRMAN GRIFFON: I agree, yes.

MR. FITZGERALD: Yes.

CHAIRMAN GRIFFON: Does anybody on the Work Group have anything else on that item 3?

I'm just wondering if you want to get into the external -- or break for lunch.

MR. FITZGERALD: Yes. This is going to be --

CHAIRMAN GRIFFON: This could be a little --

MR. FITZGERALD: This is going to be very familiar ground.

CHAIRMAN GRIFFON: Yes.

MR. FITZGERALD: But it's probably

going to bear some discussion.

CHAIRMAN GRIFFON: Right, right, right. If everybody is okay, let's break for lunch and try to get back at a quarter of because I know a couple of the Board members are trying to get at least earlier flights. And I want to make sure Andrea has some time to make some statements.

MR. FITZGERALD: Bob actually leaves at 1:30.

MEMBER PRESLEY: I'm going to leave here. The plane leaves at 2:50-something.

CHAIRMAN GRIFFON: Okay. But if we come back at a quarter of 1:00? Is that, a quarter of 1:00, okay with everybody? Yes. You'll hear the meat of the discussion, I think. All right.

MR. KATZ: Okay. So was that clear for folks on the phone? A quarter of one o'clock Eastern time.

MEMBER MUNN: All right, and I'll try to remember to take myself off mute when we're back.

MR. KATZ: Thanks, Wanda.

MEMBER MUNN: All right.

MR. KATZ: Thanks, everyone else on the line. And we'll break the line now.

(Whereupon, the above-entitled matter went off the record at 11:54 a.m. and resumed at 12:54 p.m.)

A-F-T-E-R-N-O-O-N S-E-S-S-I-O-N

MR. KATZ: Good afternoon. This is the Advisory Board on Radiation and Worker Health Los Alamos National Lab Work Group. And we're just reconvening after a lunch break.

So let me just check to see. Wanda Munn, have you rejoined us?

MEMBER MUNN: Yes, I have.

MR. KATZ: Great. And I think we're ready, then. Yes.

CHAIRMAN GRIFFON: Okay. We're going to move ahead in the SC&A issue paper. And I think, Joe and Ron, the next item is the neutron exposure, of course, external dose neutron exposure. Start there?

MR. FITZGERALD: Yes. I think this is sort of a division point already reported. It first gets down to sort of the basis for the fundamental questions. These are issues that weren't necessarily expounded

upon in the evaluation report but have a bearing for maybe a relatively small period of time. I think TLD came into being in 1980. And so there are some questions.

And these are sort of conventional questions we've raised in the past on other sites on NTA film and fading, some of the same issues and certainly Ron, who has worked the same issue for Mound and Pantex and kind of outlined some of the questions that we have on that.

DR. BUCHANAN: Okay. This is Ron with SC&A. We're on item 4 in the report.

A little background here, this is a neutron monitoring question. Los Alamos used the NTA film there in this SEC period from 1976 to 1979 and then used the model 7776 TLD system from '80 to '97 and then started using the model 8823 TLD system from '98 to 2005 or up until today.

And so what we looked at was the

ability for the neutron dosimetry system to detect the full energy of neutron doses in all of the different facilities at Los Alamos. Of course, we have the standard problem of the neutron NTA film threshold of around 500 keV or 700 keV or so, which does not see the lower energy neutrons.

And so everyone is aware that in the TBD, they recommend using an N/P ratio to replace the neutron data in the dose records for the dose period. And this has been an acceptable practice if certain qualifications are met.

And so we have a couple, three issues here. One is that the N/P ratio, which is being used for the 1976-1979 period, being taken from the TLD data from 1980 to 2004, I believe it was. Anyway, it covers a range of about 25 years or so, including both the '76 model TLD and the model 8823.

And so we have two areas, items in

this usage of this N/P data. I guess number one is is it representative for the earlier year, '76 through '79, if you're using '80 through 2004 data? Was it representative of the N/P values in these later years for this earlier period?

And the second each year is that the model 7776 had some issues in itself, which we will talk about a little later in this response function. So neutron calibration factors as a function of a facility had to be used.

And so we questioned the accuracy of the data represented, that it is identified by the data for the later years to this earlier period and also the accuracy of using the 7776 for determining the N/P ratio. In addition, the 7776 used during the period of '80 to '97, as I say, used a neutron calibration factor, NCF, which was, the way I understand it, determined for each facility

depending on the average energy of the neutron.

If there was -- now, TLDs have the opposite characteristics of NTA film. NTA film has no response for a certain threshold of about half MeV or so, a good response up to about 10 to 14 MeV. And then it starts to drop off. And so that is its energy range of good use.

TLD is kind of opposite of that. It has a high response, low energy, and drops off very rapidly at higher energies around one to two MeV. It starts to drop off at sensitivity.

And so if a facility has a lot of low-energy neutrons, TLDs are fairly responsive, has a good portion of higher-energy neutrons, its response is lower.

And so the way Los Alamos did it was they assigned neutron calibration factors for each facility. If it was a highly

moderated low-energy neutron source, then the calibration factor was low. If it was high-energy, the calibration factor would be higher.

And so this is the way the 7776 TLD dose of record was recorded. The way I understand it was the reading that came off the TLD reader was multiplied by this correction factor. So the dose of record doesn't contain the raw reading plus adjustment factor. It just contains the end result. So you don't know what the calibration factor was. And so SC&A is concerned about using this data in determining the N/P values. And so that is the '76 to '79 N/P issues.

Now the other segment is 1980 to 1989. When the TLDs were being used, there was a problem with detecting the high-energy neutrons, especially around LAMPF, where you had more high energy than you would the rest

of the facilities. The plutonium and such usually have a fairly moderated spectrum. So TLDs were good dosimeters for those.

And so between '80 and '89 was kind of a transition period in that the 7776 saw the low energy. So they attempted to use the NTA film to detect some of the higher-energy neutrons.

However, NTA film has fading. Any they found out in about '90, then, that they could seal these. It was in an oxygen atmosphere in a plastic pack. And about 1990, they got this.

And I gave a reference in our write-up in the lot, I think, in 1990, that indicated that they solved this problem at Los Alamos. And from about 1990 to 1995, they used sealed NTA film, which did away with a lot of the fading.

And so there was some NTA film used at LAMPF during 1980 to 1990. However,

from what I could find out, there was only about 40 or less than 40-some NTA films issued. And so this would not cover the workers that might have been the spokes to higher-energy neutrons in much of a fashion during this period of time.

Now they used the sealed NTA film from '90 to '95; in '95 started using the track etch dosimeter, the TED, and the 8823 TLD dosimeter, which we're not questioning it. If there are any problems there, it's more of a Site Profile issue, not an SEC issue, from about 1998 onward.

And so our main concern is we did feel that as far as dose reconstruction goes, that there was support for the fact that the N/P values that were derived were representative of the earlier '76 to '79 period.

There's a big question mark on '80 to '89 on NTA film use at LAMPF or what was

used if NTA film was used or how the fading problem was addressed. And we don't have SEC issues, really, after the 1990s.

And so our period is '76 to '89 that we're concerned about the adjustment factor using N/P and also the high-energy neutron monitoring at LAMPF during that period.

MEMBER PRESLEY: Can you just not find records? Is that one of the reasons that you're saying what you did use during that time, what correction factors were used, and things like that?

DR. BUCHANAN: I don't have any details on, number one, the correction factor. Apparently there was one correction factor used for all of LAMPF. LAMPF has wide energy and neutron energy. So they're outside the moderated field, a 500 keV would be fine. In experimental areas and such, you can have up to 20 MeV, even occasionally in a beam line or

something 50 MeV.

And so I don't see that it has been documented that the neutron calibration factors were appropriate for LAMPF. And number two is if there were high-energy neutrons, how are those monitored during this period?

The 7776 was not seeing the high-energy neutrons. Was NTA film used? If so, how was the fading problem addressed? And if only 50 NTA or 40 NTA films were issued during this period, that would cover, sufficiently cover, the workers.

CHAIRMAN GRIFFON: I mean, for me, this, unlike the first couple of things we discussed, has a lot more specifics in it, some more details. I'm not sure I could have kept up with all your actions items or at least questions, but one thing that caught my ear was the correction. Apparently the data in the database right now is the end result,

right? It's the --

DR. BUCHANAN: As far as I can tell.

CHAIRMAN GRIFFON: The calibration factors rolled in so you can't even tell --

DR. BUCHANAN: Back them out.

CHAIRMAN GRIFFON: Right. You can't back them out.

DR. BUCHANAN: No.

CHAIRMAN GRIFFON: Do we have the raw data that could be backed out if they were --

MR. MACIEVIC: I don't think we have the raw data to go back to the actual light curves and all the other and the track counts at this time. I'm sure the track -- that information does go, but in our limited capturing of data, we didn't go back to the original signals from each dosimeter to calculate this out. We do have the correction factors for each facility.

As far as an SEC issue, to me that says that the dosimeter itself or the use of that combination of dosimeters that is completely off, that the numbers -- that you aren't measuring the fields at all. I think I would go along with the idea that you could look into fading effects, apply correction factors based on that to the particular data.

But to essentially say you are running blind during that period because for the period of ten years, you didn't have a dosimeter where you have lithium fluoride, lithium-6 and lithium-7 fluoride, you've got NTA film, and although the matching up for each facility may be imperfect, it's not saying that there isn't some dose reconstruction method that you could go and correct or look to see that the number is accurate enough that to say that though that period would be in SEC would imply that that data is totally useless essentially, that

neutron doses could be well well over the values that are being recorded.

I have looked at -- before I got here, I just started to pull some data up from -- we made a database of all the neutron doses for LANL and for other sites, but for LANL from the claimant file.

Now obviously it's just a claimant file, not from the entire site, all the readings that are there. But when you look at the readings as a function of time for the years, you see that as you're running from the mid to late '70s, you start hitting where the TLD data comes in, the neutron doses jump.

And to me, that says that this badge is seeing something beyond what was the year before, from '79, '78 time period. You now see an increase in the values.

So that dosimeter is seeing a wider variety of the field and reporting the number. Now correcting those numbers to say,

well, how close that is is one thing, as opposed to saying, to me it would not have recorded anything.

If you were going to say an SEC issue, you would say this dosimeter is missing it completely. But it obviously looks like from that data there is a spike in the number of readings in the low end from the above zero and recordable up to as you start getting into the higher doses.

But that number jumps when you head into the '80s. So it's seeing something. And it is correcting or giving you a higher dose based on use of that dosimeter.

So the question is, how much do you kick those numbers by, as opposed to, what, those numbers are all invalid. And that's how I see an SEC issue, that there is no way I can figure out how to work that number to make it accurate.

And if it's a dosimetry issue of

we need to apply a factor of one or one and a half to those numbers, that's more a dose reconstruction issue, which we can work out and come to a justification and show you what we're basing it on. But I don't see that as an SEC issue.

DR. BUCHANAN: Okay. Between '80 and '89, when they're using the TLD -- and TLDs will taper off. They don't see 10 and 20 and 30. I don't see that there is dose recorded for the high-energy neutrons between '80 and '89 because it states that the NTA film, they tried it and made a calibration of TLD invalid. So they took it off after six months.

CHAIRMAN GRIFFON: Can you stop? I read that, too. You said that it made the other invalid.

DR. BUCHANAN: Right.

CHAIRMAN GRIFFON: Can you explain that? What does that mean?

DR. BUCHANAN: Invalid data, the calibration of the '77, '76 TLD badge because I guess it created scattering or interfered with or something.

CHAIRMAN GRIFFON: Oh, okay.

DR. BUCHANAN: Physically being present with it --

CHAIRMAN GRIFFON: Right, right. Okay.

DR. BUCHANAN: -- caused a problem.

CHAIRMAN GRIFFON: All right. All right.

DR. BUCHANAN: They quit using it. And then they had -- and to put it on the other collar or something, they found out it had humidity problems that they didn't really solve until '90. And so I guess my question is, do we have data for high-energy neutrons between '80 and '89 that has any relevance to what is being received.

TLD tapered off where it wouldn't see the high-energy neutrons. And then NTA wasn't there, from what I can gather, I mean, unless there are documents showing that there's more than 40 TLDs, I mean, NTA films, during that period.

Did we have data? I mean --

CHAIRMAN GRIFFON: That might be one clear follow-up. I'm trying to keep my mind on action items, too. That might be one clear action item, as '80 to '89.

MR. MACIEVIC: Right. That period you --

DR. BUCHANAN: How will the NTA film --

CHAIRMAN GRIFFON: Yes. What was the NTA film? It was badged. We have enough information --

MEMBER PRESLEY: The other thing to go along with that, is there any backup where that you can say that maybe you got a

high count somewhere but you can go back in and look at an industrial hygiene or an HP report and see if it backs up this thing?

MR. MACIEVIC: Exactly. We have one of the things that, again, sorting out, is that there are tons of quarterly reports. And we're going through. I have a person going through the quarterly reports to look at what is being reported.

And there are several things that talk about the dosimetry, about bioassay, survey results, and the whole bit. And I think that is going to be a key in pointing out all of the problems but also numbers involved in what was going on through periods of time.

So I think that will be a helpful aspect of approaching this question, how the NTA was used with that badge through the '80s.

CHAIRMAN GRIFFON: And maybe I'm incorrect, but along with this question on the

high-energy neutron being measured and whether they were using this NTA film or whatever, isn't there a matching question then? You know, assuming you find some NTA films, don't you then still have a question of whether you can match those?

MR. MACIEVIC: Pair them.

CHAIRMAN GRIFFON: Pair them up, yes.

MR. MACIEVIC: Yes.

CHAIRMAN GRIFFON: Okay. All right.

MR. MACIEVIC: Well, you can do almost like -- I'll have to look at the data and see, but, as I was doing with the software Attila and doing the glove box analysis where you're looking at the exposures in the chest and the lower torso to get a correction factor, if you run some kind of Monte Carlo with all your numbers to look at bounds on ratios between --

CHAIRMAN GRIFFON: Right.

MR. MACIEVIC: -- the measurements that you got to see what kind of ranges are you looking at so that you're not just picking and choosing. You would have to look at the whole thing and get some kind of distribution --

CHAIRMAN GRIFFON: Yes.

MR. MACIEVIC: -- to more accurately reflect what you want to --

CHAIRMAN GRIFFON: It's a factor. There are different ways you can get there maybe, but yes.

MR. MACIEVIC: Right.

DR. BUCHANAN: I just didn't want -- the high-energy neutrons during this period seems to be kind of vague right there. And that's where the SEC issue came in, is --

CHAIRMAN GRIFFON: Right.

DR. BUCHANAN: -- are we missing something. That's what I'm thinking now.

CHAIRMAN GRIFFON: But then another piece I think of your presentation -- I'm trying to pick out the main actions -- was the use of the N/P ratios from those later years --

DR. BUCHANAN: Right, the 25 years follow-on.

CHAIRMAN GRIFFON: -- applying it back to --

DR. BUCHANAN: Five-year period, yes.

CHAIRMAN GRIFFON: Application to '76 to '79.

DR. BUCHANAN: Right, yes.

CHAIRMAN GRIFFON: Okay.

DR. BUCHANAN: Yes.

CHAIRMAN GRIFFON: And I'll just ask Greg if they have -- I mean, you probably have looked into that. I don't know if you're not expecting a full response to it, but the --

MR. MACIEVIC: Well, let me ask --

CHAIRMAN GRIFFON: I guess this is the time to clarify it, but if you don't understand what SC&A is asking for --

MR. MACIEVIC: Sure.

CHAIRMAN GRIFFON: Yes, at least --

MR. MACIEVIC: Don?

MR. STEWART: Yes?

MR. MACIEVIC: On the application of the N/P ratios from the '80 to '89 data for the period just before, from '76 through '79, --

MR. STEWART: Right.

MR. MACIEVIC: -- is that just a straight extrapolation back to that period?

MR. STEWART: No. We don't use the ratio in the '80 to '89 time frame if I am understanding correctly.

MR. MACIEVIC: No. I mean, how do we use -- because we're talking about N/P

ratio to use during that period of '76 through '79.

MR. STEWART: Right. Actually, all years prior to 1979.

MR. MACIEVIC: And that is based, that N/P ratio, is based on data from the '80 to '89 time period or on N/P ratio?

MR. STEWART: Right.

MR. MACIEVIC: So is that just a straight extrapolation back to that period based on looking at what the N/P ratios are and saying you're just going straight back and saying that would apply for that period or how --

MR. STEWART: I believe that is correct, Greg, but I didn't do that work. So that was accomplished prior to my --

MR. MACIEVIC: Yes. And that goes back to the original before I, "I swear to God I wasn't involved."

(Laughter.)

MR. STEWART: I'm sorry. That's just a weak answer for you.

MR. MACIEVIC: That's fine. I think it was a straight extrapolation back saying you've got three years based on the --

DR. NETON: Right. But, I mean, the obvious question is are there processes in --

CHAIRMAN GRIFFON: Similar, yes.

MR. MACIEVIC: Exactly. The assumption was made that they are.

MR. STEWART: I still think there is a valuation of the processes in consideration of a likely neutron energy ranges.

MR. MACIEVIC: Yes.

MR. STEWART: Once again, I'll just make a plug for our process, which typically assigns claimant-favorable values, rather than --

MR. MACIEVIC: Yes, yes. We'll

get to that.

CHAIRMAN GRIFFON: We'll get into that.

MR. MACIEVIC: Right.

DR. BUCHANAN: I think one clarifying thing to look at would be if you use any lower N/P values from 1980 through the end of the 7776 era and then looked at, which is in '97, and then looked at the N/P values derived from the newer 8823 TLD --

MR. MACIEVIC: Oh, we didn't do that.

DR. BUCHANAN: -- from '99 to '05, see if we get consistent or if it's claimant-favorable to use one or the other.

MR. MACIEVIC: Right, right.

DR. BUCHANAN: And that would help eliminate some of the --

MR. MACIEVIC: That's true.

DR. BUCHANAN: -- NCF, neutron calibration factor, questions.

CHAIRMAN GRIFFON: Now those are the two main actions that I captured from what you were talking about, but I know I missed some. Other main points, Ron? I know he's --

DR. BUCHANAN: No. I think those were the two, the representativeness of the N/P value using an earlier period and the '80-'89 high-energy neutron detection.

CHAIRMAN GRIFFON: The two, yes.

DR. BUCHANAN: Yes. The NCF factor --

CHAIRMAN GRIFFON: Oh, yes, that's --

DR. BUCHANAN: Yes. It bothers me to use that for the N/P. I don't think that's an SEC issue for itself that when you start extrapolating that back to '76 to '79, then I -- and so that's the reason I asked them to --

CHAIRMAN GRIFFON: Because you're not sure what your raw data was.

DR. BUCHANAN: Right. That's all

that's stable. And so that's why I asked him to look at that when they didn't have to use that and in the later TLDs and see how those compare and just see if we have a problem here at all.

CHAIRMAN GRIFFON: Okay. So I think those are the main two actions.

DR. BUCHANAN: Yes.

CHAIRMAN GRIFFON: But you have the subtext of the full, you know, finding. Yes. All right. Anything to add on neutrons, Joe?

MR. FITZGERALD: No. Again, this is familiar turf.

CHAIRMAN GRIFFON: Yes. Right, right.

MR. FITZGERALD: This is issue 5.

CHAIRMAN GRIFFON: Yes. Issue 5, then.

MR. FITZGERALD: Yes. Let me give you a little background on this. You know, we

got the tasking to do this focus review. We did start out doing a couple of on-site visits for interviews. We currently interviewed a number of petitioners, guards, firefighters, also a lot of support workers to see, again, in the context of this particular petition and to glean both their experience as well as any issues that may have been not addressed adequately in the Evaluation Report.

We did pick up one specific issue. And, again, a lot of the issues we have just discussed have a direct bearing on the guards, firefighters, and support workers. But one in particular that was facility-specific had to do with LANSCE.

And we talked to some individuals who had worked at LANSCE and, in particular, were support workers at LANSCE. In their peculiar situation, they were there at the very advent of the conversion of the facility, were very actively involved in constructing

additional shielding in the early '90s.

And, as they would do with support workers, construction workers, what have you, in this case iron workers, they stationed these workers in temporary trailers that were located -- I'm not sure I would have picked this location. They were located right behind the beam stop in target area A.

And it turned out the trailer was also adjacent to the retention pond or the evaporation pond for the tritium. And, again, not necessarily in ALARA, good ALARA planning, but that's where it was.

So their concern was, quite frankly, what are the implications? I mean, they weren't bioassay. They certainly did have a badge.

The question was would you expect any scattering that may not have been detectable or adequately detectable with the external badging dosimetry that they had? And

what are the implications for being adjacent to this retention pond where there was apparently, based on some evidence, some fairly hefty tritium concentrations on a regular basis.

This was more on the environmental side that attention was being paid to these retention ponds. Here's a case where it's an occupational exposure to something that was being focused on from an environmental standpoint.

So we took that issue. Ron talked about the external dosimetry cases. I'll talk about the internal. But we wanted to kind of burrow in on that a little bit because it was sort of a specific case, did involve support workers, and it was a situation where there wasn't bioassay monitoring and there was some question, some question regarding whether the external dosimetry was adequate to what may have been a scatter that could have existed

but, again, did not have any information.

This wasn't addressed in the ER, but, again, this had to come up in an interview. So we did go through this kind of systematically.

Ron, maybe you can talk about what we did on the external side to run this through. We also looked at the internals as well.

DR. BUCHANAN: Okay. First of all, we needed to look at what the accelerator could produce. And just to give all of you a little background, LAMPF, Los Alamos Meson Physics Facility, or LANSCE, the Los Alamos Neutron Science Center, is an 800-MeV proton accelerator, accelerates protons up to 800 MeV.

It's a target, a half a mile long linear accelerator in a tunnel, partly underground. And at the end, you have experimental areas with stack blocks and that

sort of thing or the beam impinges on different targets or they can steer to different targets with experimental areas and then concrete blocks over and around it.

And so you have to look at the overall picture of what can be produced and at what dosimetry people -- these people were wearing. And so when it impinges upon the target, it creates a variety of particles and radiation, but the main thing you're going to see outside of any reasonable shielding, which it obviously had, is neutrons of different energies, which we spoke of a little earlier, and photons, gamma rays.

And so the accelerator cannot produce anything over 800 MeV obviously, and it doesn't produce that. Obviously on the target, if you do the physics, it might produce something in the 100 MeV range. By the time it gets outside the shielding, you're limited to about 20 to 30 MeV in neutrons and

then anywhere down to thermal, of course.

So this is the very issue we have been addressing here, is dosimetry in general. Can you see them or not? And so the number one issue at LAMPF is it's not creating any exotic particles or any cosmic rays that aren't normally present and stuff. That's what we want to clarify to begin with.

And so we are producing the neutron and gamma rays that we see at the rest of the lab, however somewhat in higher energy as possible at certain areas.

And so the question comes down to was a person badged? Was a person wearing a badge that was calibrated to the field that he was exposed to? And was that dose recorded properly?

And so at LAMPF -- and I call it LAMPF because it's easier. LANSCE was essentially the same thing. Whether you are doing LAMPF or LANSCE or whatever, you are

producing essentially the same radiation. You might produce more at one time, but that doesn't bear on its detection ability.

And so our main issue is we found out that there weren't any exotic things or unusual things being produced at LAMPF or LANSCE as it changed or they added any equipment. The question was was the person badged? Was it calibrated correctly? And was it recorded correctly?

This was what we addressed in our issue 4 that we just got through addressing. And so it boils down to the same issue. Were we badged properly?

And so we didn't find anything, like I say, exotic or anything at LAMPF that wasn't addressed in item 4.

MR. FITZGERALD: Let me interject, though. There is certainly during the -- I can't think of the official name, the Star Wars era. The facility did have a role and

some of that work, the military applications work.

You know, we were also concerned from an operational standpoint to understand that, in fact, if there were operations that would raise some implications of things that were not in the routine, experimental.

And certainly we established that while that stuff was not actually done at LANSCE, there is another facility on -- I'm trying to remember. But that technical error, there was another facility where a lot of that work was done. But it wasn't at LANSCE per se.

They did modify LANSCE but within the parameters, I think, that we were talking about in terms of energies and everything like that.

So we did go through some trouble to at least figure out whether we might be talking about maybe a different species of

scatter radiation or something that we would be concerned about from an external standpoint. But it certainly falls within the range of the TLD that people were wearing.

DR. BUCHANAN: And this is the reason we brought up the 1980 to '89 NTA film and stuff --

MR. FITZGERALD: Right.

DR. BUCHANAN: -- because we want to make sure that if there was higher energy because of changing and shielding and stuff, that the person was badged or were they badged or can we reconstruct that dose?

And so there was the ground test accelerator, it's GTA, I think. But it was not connected to the LAMPF accelerator. It was a separate --

MR. FITZGERALD: Separate facility.

DR. BUCHANAN: -- building. Yes. And so now on internal in the LAMPF, now, he

will talk about the lagoons internal. The internal LAMPF internal construction, that's why I brought it up a while ago was that is the mixed activation product. That's activation products monitoring.

And so the other issue that the craft workers were concerned with was inhalation of material coming from any LAMPF operation, LAMPFs, of experiments and stuff. And that would fall under the realm of the mixed activation products issue that we discussed earlier in the day.

MR. FITZGERALD: Yes. In addition, because of the tritium retention pond, this is sort of a question of how do you deal with a missing source-term in a way, but it's not so exotic that you had access to concentration information, you know, maximum concentrations or measured concentrations.

These retention ponds were measured quite regularly for obvious reasons,

environmental and otherwise. So the strategy was is there, in fact, that data? If that data does exist, certainly that could be used for modeling an immersion dose and their concentration data.

We did meet with the LAMPF/LANSCE operators, the health physicists. We did include them in interviews. The data does exist. I was just telling Greg at the break this is when you start getting optimistic. The individual said, "I'll get you that data right away." Wow. This is great. And I got a call a few weeks later saying, "We're not going to be able to give it to you."

So that's partly where we're at, that on the internal side, we do think -- John is on the phone. I'll say the word. We think it's trackable, but certainly to satisfy the issue, though, I think one has to get access and establish that this data exists and show a dose reconstruction approach that does derive

a maximum bounding immersion dose for workers that were being located.

These workers -- I have a photograph. I can show you later. But they were located right next to the ponds. Again, I think it's horrible from an ALARA standpoint, but, nonetheless, they were right there next to the pond.

So I think it's conceivable that given the amount of tritium that was going into that pond, that -- and there were some questions about prevailing winds. But it's certainly possible that they were getting -- and they were there for several years. An immersion dose of tritium that could be calculated, that would certainly put this issue to bed.

Again, the data does exist, I can report.

CHAIRMAN GRIFFON: And I guess --

MR. FITZGERALD: It has to be

obtained.

CHAIRMAN GRIFFON: Just sticking to my --

MR. FITZGERALD: Yes.

CHAIRMAN GRIFFON: -- action list, I guess the first part of the neutron stuff that Ron was mentioning, I think a lot of it goes back to item number 4. So the one thing that I think might need to be at least demonstrated would be -- especially since this was an issue brought forward by the petitioners. I think we should be responsive to the petition. Were they badged?

You said that as your three things. Were they badged? Did they use the correction factor? The last two I think fall back to the item number 4, but the first question, were they badged, I think we're asking specifically about the crafts and the other security folks and other people that are in that area.

DR. BUCHANAN: Anybody, yes.

CHAIRMAN GRIFFON: Anybody in that area. Yes. So we might need an action to --

MR. FITZGERALD: We did ask that question, but we can verify that every --

CHAIRMAN GRIFFON: You asked it through interviewing.

MR. FITZGERALD: Well, I mean, the question is --

CHAIRMAN GRIFFON: They were badged.

MR. FITZGERALD: They weren't monitored. They were not monitored.

CHAIRMAN GRIFFON: They were not monitored?

MR. FITZGERALD: They were not bioassayed.

DR. BUCHANAN: They were badged, not --

MR. FITZGERALD: But they were badged.

CHAIRMAN GRIFFON: Oh. They were badged.

DR. BUCHANAN: Badged but not bioassayed.

CHAIRMAN GRIFFON: Okay.

MR. FITZGERALD: Badged but not bioassayed.

MEMBER BEACH: Do we have a history of what happened to those ponds? Did they mediate them?

MR. FITZGERALD: Yes. They had to mediate them, and they did.

MEMBER BEACH: Do you know what year that took place?

DR. BUCHANAN: Well, I can give you a little background if you are interested. This is Ron.

When LANSCE operated, they had four drains and stuff that drained into a retention pond. They had three retention ponds out to the south of the beam stop. And

the trailers were kind of between the beam stop and the retention pond. Retention ponds originally were just ponds that they drained all of the experimental areas into.

And so I would like to clarify that it had sometimes more than tritium in it. It would have any other activation products or anything that might be in there.

MEMBER BEACH: Sure.

DR. BUCHANAN: And so what they did, they would get one full. Then they would put some in another. Then they would build another. And so finally they said, you know, EPA or whoever came down and said, "This isn't a good practice."

So they quit using those. But when they dried up, then you had some airborne stuff.

MEMBER BEACH: We had the same issue at Hanford. And that's why I was curious what the year was that they --

DR. BUCHANAN: They finally stopped using the older ones before 1990. And then they stopped -- they started filling them, covering them over to keep wildlife and wind, in the '90s. And so I think they were all fairly well closed by 2002 or something like that.

But you had two problems. Number one, when there was water in the retention pond, you had evaporation that can take place and carry emerging cloud of tritium or anything else that would evaporate, probably mainly tritium in that case.

And then when they dried up -- Los Alamos is very arid. And it would blow the dust and stuff. It could become airborne. And so you would have tritium. And any other radioactive material could become airborne.

And so somebody working in a trailer or a bystander, so to speak, would just be exposed to inhalation. Now, like I

say, it's badged. It would pick up any badge, any external exposure. And there was no neutron. So that wasn't a question.

Now if a person worked on that, you know, this would be a separate group if they -- and probably the crafts weren't involved in that. If you actually got down and dug in the mud and played with it and did the remediation, then you would have more of an exposure. And I would think those people would be bioassayed, but I don't know that.

MEMBER BEACH: Do we know when they dug those out?

DR. BUCHANAN: It was in the '90s, I think --

MEMBER BEACH: It was the '90s? Okay.

DR. BUCHANAN: -- or 2000. I would have to look it up but somewhere in that area.

MEMBER BEACH: Well, I know we had

a trouble with tracking the animals and having contamination out of our ponds.

DR. BUCHANAN: They did some of that there. And then I think they finally covered it up with special stuff. It's in the report here. You keep the animals and the dust down.

MEMBER MUNN: But from your report, it doesn't look that the measured exposures were extremely high. We're working on the assumption, are we not, that the individuals -- did I misunderstand the discussion? The individuals that are of concern here are people who work out of those trailers, not in them, on a routine basis?

DR. BUCHANAN: Well, they were stationed in the trailers and worked around LAMPF facility.

MEMBER MUNN: Right, right.

DR. BUCHANAN: And so they spent some time in the trailer, some time around the

beam stop, around the shielding and that sort of thing.

MR. FITZGERALD: Yes. They were based in the trailers but worked on the site.

MEMBER MUNN: So that the assumptions that we're discussing about immersion would be limited in time in any case.

MR. FITZGERALD: Yes.

MEMBER MUNN: You're assuming that the lagoons really and truly were operating at their very worst.

MR. FITZGERALD: Yes. I mean, there were some real variables involved. First off, the workday, the --

MEMBER MUNN: Okay. Just wanted to make sure I understood that.

MR. FITZGERALD: And I think the starting point is maybe a maximum immersion for an eight-hour workday, but you did definitely know that that would be bounding

because it would be less than that.

MEMBER MUNN: Right.

DR. BUCHANAN: And in the example I gave on page 34 of the report, which is just a snapshot, this is all the data that I could easily come by showing the concentration of some activation products there, and the date was 1989.

MEMBER MUNN: Right.

DR. BUCHANAN: And there's kind of a snapshot in time to get a rough idea of what might be there. And it showed that tritium was, I think, the only one that exceeded the discharge limits.

But we really don't have a good way to answer the petitioners in saying, you know, "This is the maximum you could have got there in this 20-year period" or something.

MEMBER MUNN: Yes. But your primary radionuclide that you're looking at, though, is low energy-emitting beta, right?

DR. BUCHANAN: No. Well, they're beta and gamma. They're cobalt, standard activation products.

MEMBER MUNN: Yes. But you were talking about tritium.

DR. BUCHANAN: Yes. Tritium is the one that exceeded the discharge limit by a factor of eight.

MEMBER MUNN: Thank you.

DR. BUCHANAN: Low energy base.

CHAIRMAN GRIFFON: So as far as the actions, is there any action about the badging? The people you interviewed were pretty affirmative that everyone was badged.

MR. FITZGERALD: LAMPF was a radiological area.

CHAIRMAN GRIFFON: Yes. Okay.

MR. FITZGERALD: So they would have been externally badged. We did ask them questions, but because of their status, they weren't bioassayed.

CHAIRMAN GRIFFON: So the follow-up would be on the tritium holding pond would be one action and whether there is data. I mean, currently there is some data.

MR. FITZGERALD: Currently there is data.

CHAIRMAN GRIFFON: Yes.

MR. FITZGERALD: I would propose that maybe on an agency-to-agency basis, it can be obtained because we already tried the contractor-to-agency basis.

CHAIRMAN GRIFFON: At least attempt --

MR. FITZGERALD: We attempted to put it to bed before even having this discussion but weren't successful. So I wasn't quite sure where to go from there. But I just want to report that I think the data exists. I think, again, it can be done, but we have not.

DR. BUCHANAN: Yes. We just need

to look at the data through the 20-year period or so -- I think it's '80 to 2000 or so -- and look and see if there is a plausible route of exposure there and what magnitude would it be. Is it something that we should be concerned with and do dose reconstruction for, or is it something that falls below a minimum amount that's important?

MEMBER MUNN: Get better data and put it to bed.

MR. KATZ: Sorry, Wanda? Repeat that.

MEMBER MUNN: Yes. Get better data and put it to bed.

CHAIRMAN GRIFFON: The other item I have was you mentioned something about mixed activation products. I assume that was in the facility. The question of --

DR. BUCHANAN: Yes. That's what we talked about this morning. I just want to make sure the petitioner understood that we

addressed the inhalation problem at LAMPF in this morning's session.

CHAIRMAN GRIFFON: Oh. Okay. So that was --

MR. FITZGERALD: And there is actually an external component as well, but, again, it calls this --

DR. BUCHANAN: The badging.

MR. FITZGERALD: -- the badging issue. They had actually monitored for external radiation ponds. And there actually was a reasonable field, I guess.

CHAIRMAN GRIFFON: So the other item is reflected back in our earlier action?

MR. FITZGERALD: Yes.

CHAIRMAN GRIFFON: Okay. So it looks like just the one follow-up on that.

MR. FITZGERALD: Yes. I think the key is that it's a source that has been identified as addressed -- the data appears to be available. And that was one question we

had that --

CHAIRMAN GRIFFON: Okay. All right.

DR. MAURO: This is John.

One question regarding the ponds. I understand that the tritium issue and when the pond was filled with water. I guess I am a little bit more concerned about once the pond was dry. It sounds like it's going to be pretty challenging to have some information on what the Becquerels per gram were of various radionuclides in this dried sediment.

If you have handle on that theory, you could go ahead and do some scoping calculations on what might have become airborne. But if there's no handle on that, you've got yourself a difficult scoping calculation to do.

DR. BUCHANAN: Well, John, this is Ron. When they did the cleanup, they should have taken samples. And I think they took

sludge samples, even when there was water in it.

DR. MAURO: Okay. Good. That's a critical fact. If you've got that information, you're in pretty good shape.

CHAIRMAN GRIFFON: Thank you, John. Good point.

MEMBER MUNN: And your report indicates that the environmental surveillance reports that were done at the time indicated 2,000 millirem and 3,000 millirem yearly exposures from what was there. So it gives you a good feel at least. The magnitude of what you are looking at is not an enormous exposure.

MR. FITZGERALD: Yes. I think that's reasonable. I think, really, we're close -- parameters that can be used. And I think this one could be put to bed, we were hoping to have it today, but we didn't quite get there.

CHAIRMAN GRIFFON: Okay. Then let's go on to item number 6, which wasn't read into the --

MR. FITZGERALD: Yes. This is sort of a carryover to some extent from Mound because we did a lot of sort of complex-wide look at stable tritium compounds because it was what interconnected the sites.

And as part of that review, we did establish that some of the more insoluble tritides, including hafnium tritide, was handled at Los Alamos. I really can't get into too much detail because of the sensitivity, but, frankly, some of the same issues that we have grappled with at Mound, which is what was handled, where it was handled, who handled it, what time periods, would be germane to in a way what the implications are for dose reconstruction.

We did not go any further than just establishing by review of documentation

that it was present. We didn't go into some of the parameters, which I think is probably a reasonable next step. I think we have laid this all out here, as did some of the issues, implications for dose reconstruction.

Again, I think -- and we can go over that in some detail, but I would just say that we have covered this quite a bit at some of the other sites. I think if we establish it's present in terms of the handling, then the rest of it is just really trying to figure out if one can bracket it by understanding time frames, locations, and what workers were involved and, frankly, pinpointing insoluble compounds in particular, whether it's dose-reconstructible using OTIB-0066 and other documents that talked about it on the sites.

And that's where we left it because, again, I think it is paramount of just establishing these parameters that would be a way for the guys to make sure they didn't

do that.

I guess for people on the phone, I don't want to leave it too brief. The implication on this thing is that some of the particular tritium compounds -- we call them special tritium compounds -- are highly insoluble -- not insoluble, a lot less soluble than the other compounds in the body. And, therefore, unlike tritium, which tends to be excreted rather readily, detectable in bioassay, which makes it much easier to monitor and to dose-reconstruct.

In these cases, you have to take a much different approach. It's retained in the body to a much higher degree. And if you're not sensitive to that insolubility and you don't adjust your bioassay and dose reconstruction to reflect that, then you're going to be certainly potentially missing dose from the individuals that are taking this in.

So what we're saying here is that

it certainly appears to have been handled at Los Alamos. And the question now is to review the information at the Site and to establish whether there is enough information to adjust some of the tritium values if necessary to reflect these compounds that might have been retained in the body that may not have shown up in bioassay as routinely as the normal tritium.

CHAIRMAN GRIFFON: So the checklists and the RWPs in the later years, do they reflect any --

MR. MACIEVIC: Not for things that I've seen. I mean, talk about tritium, not necessarily tritides.

CHAIRMAN GRIFFON: That's right. Just curious.

DR. NETON: You've established, definitely, that hafnium tritide is present at Los Alamos. I mean, once that is on the table --

CHAIRMAN GRIFFON: I think we have got similar issue here. Yes.

DR. NETON: We're going on a parallel path around this.

CHAIRMAN GRIFFON: Yes. Right.

DR. NETON: And some part of me says Mound is much further along in that analysis. It might behoove us to wait to see how some of the --

CHAIRMAN GRIFFON: Right, right.

DR. NETON: -- ethical and/or policy factors that arrive there are handled --

CHAIRMAN GRIFFON: Yes. For this issue I was saying action is too finding and kind of on hold.

DR. NETON: I would think so.

CHAIRMAN GRIFFON: Yes.

DR. NETON: You know, it's the same --

CHAIRMAN GRIFFON: Yes, same

issue.

DR. NETON: -- exact rationale.

CHAIRMAN GRIFFON: Right, right.

MR. FITZGERALD: And there's every possibility that the sources involved were completely sealed, in which case the exposure pathways would not exist. So this is to say that --

CHAIRMAN GRIFFON: And the same challenges of identifying the personnel, yes. Right.

DR. NETON: Even if you can't identify the personnel, that is this --

CHAIRMAN GRIFFON: Yes.

DR. NETON: -- proposed material plausibly bounding given the fact that they're measuring it in the large signal of other tritiums.

CHAIRMAN GRIFFON: Right.

DR. NETON: Those are issues that are on the table.

MR. FITZGERALD: And the backdrop of the tritium noise might be much different at Los Alamos because of the fact that you have a production facility at Mound. You have a lot of tritium. In this case that --

CHAIRMAN GRIFFON: Sure. Yes.

MR. FITZGERALD: -- may have been handled without any tritium background. So it might be actually more manageable.

DR. BUCHANAN: It does bring up the question, though, at Los Alamos. I noticed that in OTIB-0062, it only gives tritium dose. It doesn't give tritium a bioassay data. Is that traceable back to bioassay data or did they only assign dose at Los Alamos after tritium.

MR. MACIEVIC: Well, there should be bioassay data as well for the tritium. And you can correct me, Liz, if that is incorrect, but there should be bioassay data back, too.

MS. BRACKETT: The way that we

have been doing tritium coworker studies is taking the bioassay results and converting that into dose because that really is the best way to do a coworker study.

And because tritium is very short-lived in the body, it is possible for us to do dose calculations en masse. You know, you don't have to look at the individual and figure out when the intakes occurred and look at their entire history. You can take the results and convert them to dose. And so that's the way we've been doing any tritium results that we have.

So we would have the bioassay results to go with those.

DR. BUCHANAN: Okay. So if there was a different type of tritium, that could be reworked to reflect --

CHAIRMAN GRIFFON: It is there. Right, yes.

DR. BUCHANAN: Okay. Very good.

Thank you, Mark.

CHAIRMAN GRIFFON: Yes. All right. So I don't think there's much further to go on that. And we'll --

MR. FITZGERALD: No. And I agree.

CHAIRMAN GRIFFON: It's on the table. Yes.

MR. FITZGERALD: It's worked rather rigorously. So it's something that could benefit from whatever happens --

CHAIRMAN GRIFFON: Okay. All right. I think we're at the last issue in the matrix.

MR. FITZGERALD: Yes. And this issue borrows directly from the tradition. I mean, we did the interviews, and we did the original analyses. Of course, we focused on the issues that were the subject of the petition.

We wanted to interview the guards, firefighters, and support workers. We wanted

to look at the question of how monitoring was done and this question of lack of, in particular, bioassay monitoring, the implications of that, and to really question the health physics staff as to just issues such as the guards were not bioassayed when they patrolled facilities, like TA-55, and how is that all right given that certainly the operators and the staff in those facilities were bioassayed routinely and just really probing the question of how these decisions were made and more so lately because, actually in TA-55, which is the plutonium facility, they do now bioassay guards over the last what, two or three years now? I think it's a couple of years that they react.

MR. EVASKOVICH: No. It's only been a year.

MR. FITZGERALD: A year? Okay. So they have actually reversed that and are now I guess providing bioassays for the guards

in TA-55. So these are just some questions about okay. What is the basis for the dosimetry afforded these support workers in regards to firefighters?

And what is the rationale for making those decisions? And was the data collected and valid over that time frame I am talking about? Because of the preliminary nature of our review, you know, sort of the question of how far we would go in, I think we decided to do a sampling.

Again, we interviewed. We got a lot of feedback. We wanted to do a sampling of the actual data that was collected from a bioassay standpoint. And Ron actually performed a cross-section.

And, again, this is a sampling of 30, which I thought was a reasonable number at this stage, but just to get some sense of what the bioassay record was during that time frame. So do you want to outline that?

DR. BUCHANAN: Okay. To try to look at what the bioassay policy was for workers during this SEC period that may have been involved in tryouts because we're still looking at the LAMPF situation and security and other type of people that maybe weren't involved in production or experimentation, I went through the period, the SEC period, and looked for this type of person who had a claim. That's what I have access to, is the claim data.

And so I went through and did the sort and found 30 workers that worked during this period that could have been exposed to the radiation but maybe weren't bioassayed because at that time, they didn't bioassay everybody.

And so I looked at those. And I selected the 30. In fact, that's about all that came up that fit the category, was 30. That's the reason I chose 30.

And so then I looked at the data. I didn't look at it beforehand. I looked at it after I sorted those 30 out as far as job title and period that they worked. And I went through, and I looked at their bioassay data to see how they were bioassayed.

I looked at a couple of lab assistants in there and a couple researchers, too, to compare them by focusing on the craft security. And so that is what I, in the report, I looked at in table 4 there.

I looked at the number of years on page 43 of SC&A's report that you just received. Table 4 on page 43 shows the workers. It should be 30 of them listed there from A to DD and the position title and the number of years worked during this period and then the number of years bioassayed during that period. And "bioassayed" means urinalysis or whole body count or chest count or whatever or a number of them in that year,

was bioassayed at all during a particular year.

And so, as you can see there, it varies quite a bit. For example, you know, some chem techs were bioassayed 100 percent of the time and others were like 27 percent of the time and custodians the same way and security and inspectors and firefighters and such.

So during this period of 1976 to 2005, what it indicated was that the bioassay appeared to be by need rather than by title or craft. Now, this is a limited sample, this 30 sample of claims. Okay? Because I didn't go through and do the whole database.

And so when I looked at that, I said, "Well, you know, that's the kind of conclusion you reach, is that it's by necessity as opposed to job title." And so I said, "Okay. Let's look at security-related personnel because that's what the petition was

named in.

And so table 5, then, on the next page, page 44, I went through and there were six of those that might have had security guard-type responsibilities. And I went through and looked at their bioassay. And was it on a routine or just event-driven?

And, as you can see, I looked at both areas. And you can see the number of years they have bioassayed out of the total. And did it appear to be -- and that's kind of hard to judge.

I considered routine as if they were monitored periodically through the year. And that doesn't necessarily means they were monitored every week or every month, but did it look like it was spread out through the year or was it just maybe one data point during the year? I consider that an event-driven special; whereas, if there were several right out through the year, some sort

of routine basis.

As so I find that for this period, that five out of six had routine, one did not, some sort of routine indication. And I said, "Okay. What period?"

And so Joe suggested, "Well, what period was that for?" '76 to '05 is a fairly long period, 20, 30 years, or 25 years. And I couldn't get too specific. Because of Privacy Act, I couldn't, put down what years and stuff.

So then if you look at figure 3 on page 45 -- and this is where I come from this morning on the ending of the bioassay. We see that most of this bioassay for these six security people -- okay. This was for figure 3 on page 45. It's for the six security people that worked during this SEC period.

And you see that the bioassays are more prevalent before 1990 or so, 1990-1991. And so recent security force up to '05 has had

less bioassay in by urine, by uranium, plutonium, americium and whole body count, and tritium count than the previous 15 years.

And so this is where we arrived at, was that generally looking at the 30 cases, it looked like they were bioassayed by the job they performed, rather than the job title. However, it looked like the security force did have some routine bioassaying up to about 90. And then it tapered off a lot. And so that's the point we reached.

MR. FITZGERALD: Which actually tracks with our interviews, which suggested that the guard force was pulled off routine bioassay about that time frame.

I think Jim mentioned earlier there was a decision made pretty much across the Department with the new reg, 100-milligram, to actually take people off of monitoring. It was deemed not cost-effective or needed. And so I think that was a decision

that was made. And it clearly shows up in some of these analyses.

Again, this is a relatively small sample given the preliminary nature of what we are doing, but that sort of tracks with what we got from the interview, "Yes, we were not bioassayed."

But we talked to some of the people that go back a long time. They do remember a time when they were. So this kind of evoked this question about, you know, can one get one's hands on a missing dose? And is there a distinction that can be made?

Now, certainly talking to health physics staff, there was a judgment that they met the regulatory threshold of 100-millirem or less and, therefore, did not have to be monitored, but we wanted to probe that. And that's where we came out. Clearly there's a question of whether, in fact, everybody was, in fact, at this level of a missing dose could

be covered that way or not.

MR. MACIEVIC: Have you looked at the -- Jim Lawrence has several emails and procedural directives over time that show you the decision levels as to who and when and how they were going to be monitored throughout time. And I don't have that.

There is a sequence that you can match that up with --

MR. FITZGERALD: Yes.

MR. MACIEVIC: -- whether decisional values were made to do this and for what reason they were made at that time.

MR. FITZGERALD: Yes. This is reported. We wanted to really look at the data to understand the implications of not having this monitoring going on and to look at sources that the crafts and guards would be exposed to and then try to conclude whether or not this is a dose reconstruction issue.

I think our conclusion is we're

reporting it, but it goes back to the earlier issues that discussed whether or not you could put a coworker dose application for these kinds of workers. And that would address these issues but understanding, of course, that while these workers had very broad access to things like firing areas, to LANSCE, to the waste management facility, it's much broader than some of your typical workers. So that would be the implication, that the coworker model would need to be applicable.

So this one here doesn't lead to an action, but just so --

CHAIRMAN GRIFFON: Well, I guess that's sort of the action, just what you said.

MR. FITZGERALD: Right.

CHAIRMAN GRIFFON: It's coworker model bound this particular class of worker.

MR. FITZGERALD: Yes.

MR. MACIEVIC: How it applies in the --

CHAIRMAN GRIFFON: Right, right, right.

MR. MACIEVIC: And that is the main gist of the whole ER --

CHAIRMAN GRIFFON: Yes, yes.

MR. MACIEVIC: -- is the worker.

MR. FITZGERALD: Right, right. But, again, we wanted to show you what we kind of went through to walk this down and to understand exactly the history, the operational history, of what happened with the bioassays and to look at the implications, actually look at it, as Ron has pointed out.

MR. MACIEVIC: And, I mean, there might be some obvious places to go here. I mean, I think you have at least, well, six cases, although they have mixed job title stuff.

MR. FITZGERALD: Well, yes.

MR. MACIEVIC: You know, you do have data for those. And it might be possible

to demonstrate that the coworker model's bounding it. I don't know.

MR. FITZGERALD: I think we almost have --

MR. MACIEVIC: We have some real data.

MR. FITZGERALD: You have to walk through the coworker issues first.

CHAIRMAN GRIFFON: First. Yes, yes, yes.

DR. NETON: I think a lot of you have got to go back to the rad tech program itself, though. And, as we talked about earlier this morning --

CHAIRMAN GRIFFON: Yes.

DR. NETON: -- restrictions were in place. So any worker who had these large potentials for exposure were actually monitored to begin with.

I mean, you've got the workers that are in radiological areas being

monitored. And it's sort of a leap of faith to suggest that, all of a sudden, these other workers were not even considered or they were unaware of the fact that there were these large characterized exposures out there. I think it's sort of a --

MR. FITZGERALD: Well, that's not what I'm saying. Actually, I think our line of reasoning is the same, that we were looking certainly independently to judge whether or not the program did encompass these workers in a way which would be the confidence that --

CHAIRMAN GRIFFON: It would sort of validate the decision --

MR. FITZGERALD: The decision to validate.

CHAIRMAN GRIFFON: Yes, yes.

DR. NETON: You know, if the coworker model -- how do I say this? If the coworker model sufficiently encompasses all categories of more highly exposed workers than

by definition, it would bound the people who had the --

CHAIRMAN GRIFFON: Yes. That is true, right.

DR. NETON: -- for us access to other areas as --

CHAIRMAN GRIFFON: Yes. That's true.

MR. FITZGERALD: And I think that's where we're going. It's a separate issue, really. It just is back to the other one.

DR. NETON: It's actually been the entire basis for the core monitored to begin with. Workers who have no monitoring data, could they have been exposed to a ten-coworker model?

CHAIRMAN GRIFFON: Still bound.

DR. NETON: Or been more heavily exposed bound.

MR. FITZGERALD: Right.

CHAIRMAN GRIFFON: Yes. Okay. I think so, yes. And that goes back to the coworker model because the main action, I don't think there's any specific action for that one.

MR. FITZGERALD: I think we just wanted to lay out what we had done to look at this question.

CHAIRMAN GRIFFON: Okay. Is there anything else out of your report, Joe or Ron, you think we should explore now? That comes to the end of the issues, right, the items?

MR. FITZGERALD: Yes. And, again, this was quite without core groups involved and just doing some initial baselining against some of the issues raised in the ER.

So this is what we had come up with as sort of questions. A lot were just clarifying questions, but some of them --

CHAIRMAN GRIFFON: Yes. Right.

MR. FITZGERALD: -- are issues

that we wanted to put on the table in a preliminary way.

CHAIRMAN GRIFFON: Okay. I'm just going to ask for like a five-minute comfort break.

MR. KATZ: Before we do, let me just remind a process that we're doing with all of the Work Groups is if DCAS and SC&A would just send out after this meeting a confirmatory, "Here are our action items as we heard."

CHAIRMAN GRIFFON: I was actually going to --

MR. KATZ: I mean, we can run through the --

CHAIRMAN GRIFFON: I have been keeping track of those.

MR. KATZ: -- transcript, but transcript doesn't come for another --

DR. NETON: Option of the Chair to maybe generate the action item matrix and

comment on it.

CHAIRMAN GRIFFON: Yes.

DR. NETON: I mean, I did more. It would be --

CHAIRMAN GRIFFON: I have been doing that myself usually.

DR. NETON: Yes.

CHAIRMAN GRIFFON: So I would --

MR. FITZGERALD: We were all hoping you would do that.

(Laughter.)

CHAIRMAN GRIFFON: I will. I will. Yes, I will. Before I circulate it widely, sometimes what I do is send it out to make sure that we have agreement from -- yes. Sometimes it --

MR. MACIEVIC: I know I scribble things down on --

CHAIRMAN GRIFFON: Yes, yes. And I think in our debrief this morning, I think I got most. That was the bulk of them,

actually. So I think we're in agreement on most things.

But I'll circulate those soon because if I wait more than a week, they'll be out of my head.

MR. KATZ: And if you'll copy when you do that?

CHAIRMAN GRIFFON: Yes. I will. I will. Just five minutes, and then we're going to let Andrew take over.

(Whereupon, the above-entitled matter went off the record at 2:07 p.m. and resumed at 2:18 p.m.)

MR. KATZ: We are reconvening after a short break. It's the Los Alamos National Lab Work Group. And we're going to hear from Andrew, the petitioner.

MR. EVASKOVICH: My name is Andrew Evaskovich. I filed the port service workers petition following the general petitions to LANL that [identifying information redacted]

filed.

To kind of review, the reason the petition was qualified was because of the exotics. And that was mentioned at the Board meeting in Denver of '07, when the first petition was qualified. Basically Greg and LaVon Rutherford had stated that they wanted to look at further years. And that was the reason why my petition was qualified.

In reviewing a few petitions, I did find a discrepancy between them in section 7.1, particularly 7.1.1 on page 39 of 77. It says on the -- and this is for the 7605 evaluation-- TUPo data from notebooks, the former records prior to 1980. It specified the year 1980. However, in the 43 to 75, in 7.1.1 on page 67 of 117, it says the TUPo data from notebooks is from years prior to 1990.

So there's a ten year difference in the record sets. So I'm just curious if that affects the data sets and what the reason

was for the discrepancy.

DR. NETON: Could you go through that again because I didn't quite catch the --

MR. EVASKOVICH: 7.1.1 from the 7605.

DR. NETON: Okay.

MR. EVASKOVICH: And that's on page 39 and 7.1.1.1 on page 67. There's a ten year discrepancy in the years. The later report says 1980. And the earlier report says 1990.

DR. NETON: Thank you.

MR. KATZ: Before you go on, is there someone who can answer the question right off the bat or --

DR. NETON: No.

MR. KATZ: Okay. I just didn't know if there was someone on the line who is actually familiar who --

MR. BURNS: This is Bob Burns. I ended up, I inherited OTIB-0063. My

recollection without looking at it is that TUPo data did go through 1990. So if there is a 1980, I'm not sure. That could simply be a typo. But that's something that we will need to look at.

CHAIRMAN GRIFFON: Okay.

MR. EVASKOVICH: Yes. That's what I was wondering, whether or not it would be a typo because '8 and '9 are next to each other.

MR. KATZ: Thank you.

MR. EVASKOVICH: When we're talking about the validity of the coworker data, some issues come up concerning, well, for one thing, the firing sites. My question is, what is the intake based on, what workers? Because it seems, looking at the data, it is all generalized either for the whole Site, Los Alamos, or maybe it's broken into technical areas, but I haven't really seen it broken into technical areas in the OTIBs.

But when you're dealing with the

firing sites, you have the detonation of explosives, but they're also using radiologicals there. And I believe, Bob, you told me at the LAHDRA meeting that they did use exotics at the firing site.

So I think that does raise an issue concerning the exposure to exotics and whether or not support service workers were monitored because it's not just the explosion, but it's also the clean up afterwards and potentials for fires because firefighters did have to respond to these areas and put out fires.

So my question is, what data are you using in order to determine dose? Because it would seem to me that the dose of firing site from resuspension would be different, say, from the dose for a glove box worker, you know, entirely different environments, entirely different types of exposures.

As far as dealing with also I

believe in the LAHDRA report or at least in the LAHDRA meeting, it was discussed that recent tests and files were scattered and not compiled concerning the explosives areas. So there is a question of the quality of the records at the explosive or the firing sites.

Concerning worker records and episodes, you know, you're going to have to question who had access to the areas. I'm trying to get a little clarification here. I think it just depends because we handled a lot of the access to the areas, but guards weren't per se on the badge readers. I know there are some areas that we go to that we use keys to access, as opposed to badging, just like regular lab personnel.

Additionally, I think you have to question whether or not the electronic data is present from the badge readers because some badge readers, you run the badge to determine whether or not a person has access. You have

to question whether or not that system records the fact that the badge was read so that the person could enter the area.

And in the earlier days, badge readers weren't present. And I think it's a question of whether or not paper logs were maintained of when people went into the area or was the person's badge just looked at, handed back to them, and say, "Yes, you have access to the area."

And, of course, we control that, but there are some areas even now -- like LANSCE is a big example. In order to gain access to the area, you have to present a badge. The guard looks at it. They go in, but there's no record of them actually entering the area because the gate is open. It's just the guard controlling access.

So how do you determine as far as who is in the area working unless different buildings? I haven't worked LANSCE that much

to know whether or not there is badge reader access into those areas.

But you have to look at the earlier days and determine what type of records are present or workers or just people in general and how they have access to the areas.

One of the other issues that comes up is the checklist. And I'm not too sure which checklist Greg is referring to, but I know there is one that we fill out annually for, I believe -- I'm not sure it's to put us in the bioassay program but it is part of the occupational health program as to exposures to radionuclides.

The thing is if you're asking a worker what they're exposed to, you either say, "Yes" or "No." And if you don't know, generally people mark "No," that they -- you know, whether or not they have been exposed.

So it is kind of a catch-22.

They're saying if they're using this to determine who they are going to monitor or put into the bioassay program and if the person doesn't know themselves, then they aren't going to be included into the bioassay program.

CHAIRMAN GRIFFON: What is this -- let me stop you there a minute -- tool they're using? This is a questionnaire?

MR. EVASKOVICH: It's part of the occupational health program.

CHAIRMAN GRIFFON: Okay.

MR. EVASKOVICH: And they question radionuclides.

CHAIRMAN GRIFFON: So it's not from the health physics dosimetry side? It was the --

MR. EVASKOVICH: I'm not sure if they use it or not.

CHAIRMAN GRIFFON: Right. Yes.

DR. NETON: I suspect there are

two separate --

CHAIRMAN GRIFFON: Two separate things.

MR. EVASKOVICH: Possibly, yes. There is that but, then, you know, as far as the dose reconstructions go because I know they access the health records.

CHAIRMAN GRIFFON: Right.

MR. EVASKOVICH: So would that be included as well? And if HRP is looking at it and says, "Well, he checked here 'No'"? So there is an issue there. And if the individual doesn't know what they're exposed to, generally they can just mark "No."

CHAIRMAN GRIFFON: Okay. I've got it.

MEMBER BEACH: Andrew, who maintains those records? Do you know?

MR. EVASKOVICH: I believe that would be part of occupational health. I'm not too sure if those are included in the records

that are submitted for a dose reconstruction, though, but I know that they are used.

MEMBER LOCKEY: Was that question asked about occupational exposures or medical?

MR. EVASKOVICH: I think it deals with occupational exposures, but it's part of the medical survey.

MEMBER LOCKEY: All right. Does the person get some kind of medical test? Is that how the question -- that's what I'm trying to figure out.

CHAIRMAN GRIFFON: Based on the questionnaire, do they get certain testing? Is that what you're saying?

MEMBER LOCKEY: Medical diagnostic testing. They use some kind of radioactive material?

CHAIRMAN GRIFFON: Oh, yes. Yes.

MEMBER LOCKEY: That was the question. It was a medical questionnaire based on their personal medical care or was it

based on their occupational exposure?

MR. EVASKOVICH: I think it just deals with occupational exposure.

MEMBER LOCKEY: Just occupational? Okay.

MR. EVASKOVICH: They also look for chemical exposure as well or heavy metal exposure. And they also list those.

CHAIRMAN GRIFFON: Okay.

MEMBER BEACH: So do they use that to base your physical, annual physical, on?

MR. EVASKOVICH: Well, that is part of the annual physical. I think they look at it to determine the health aspect of it. I think primarily with us, that just deals with the HRP program.

Now, I'm not too sure if workers that are not HRP are included in that because we have security guards that don't go to manual physicals. So I'm assuming that they don't fill out those questionnaires --

MEMBER BEACH: Right.

MR. EVASKOVICH: -- the security officers because they're not armed and they're not part of the HRP.

I still question whether or not all the source terms environmentally have been examined and identified. There are still issues with the areas of concern and potential release sources. And I don't feel that those were addressed in the Evaluation Report.

Additionally, the New Mexican Environment Department and Los Alamos National Laboratory are supposed to be issuing a joint report concerning contamination at the laboratory. It's a new report that they have compiled. And they have determined that they do need to do a federal investigation to determine whether or not it's compensable to the surrounding lands, such as Bandelier National Monument and Santa Clara Pueblo and San Ildefonso. So I think those issues need

to be addressed as far as the environmental because you're still dealing with resuspension issues and passive exposure.

CHAIRMAN GRIFFON: You said source term issues that haven't been addressed yet.

MR. EVASKOVICH: Yes.

CHAIRMAN GRIFFON: Do you have specific ones or --

MR. EVASKOVICH: Well, I do. I relate them in my report. I especially there list a large number of --

CHAIRMAN GRIFFON: So going back to the petition itself?

MR. EVASKOVICH: Yes.

CHAIRMAN GRIFFON: All right.

MR. EVASKOVICH: And then talking about LANSCE and the activation product issues, well, in my petition, there is a discrepancy between that and I believe the latest update to the environmental exposures in the TBD because basically they say the

winds going to TA-72 are three percent. And in the petition, I provide documentation that says the winds going towards TA-72 are 26 percent.

So depending on whether or not you can do those for the activation products, you're still going to have a discrepancy as far as what the guards are going to receive because TA-72 is basically operated by the guards. That is our firing range.

And, as I stated in the petition, the hours of operation at LANSCE for the highest outputs are the same hours that we are generally at the firing range shooting. So the exposure potential for guards is pretty high in that area. And you've got that 23 percent discrepancy in your wind values. So I think the wind values have to be looked at.

I cite Bowen long-term tracer study in my petition. They used a different report from '84. And mine was a later study

that was done actually concerning wind releases on site and the monitor.

As far as -- I'm not sure that it's actually an action item, but it was discussed -- concerning the regulatory rules and policy changes, the fact that LANL was slow to respond, I did also address that in my petition as well. And I referenced GAO reports.

The issue developed in the late '70s, actually. And it took several years before a response came around. The documents that I cite actually kind of give a history of that as far as the whole complex, responding to those issues. The big concern for us would be the Sierra Grande fire and the monitoring that took place during the fire.

I think they cited one air monitor in Mortandad Canyon, which data that they would use in order to determine dose for firefighters and guards and other people who

were on site during the fire.

The issue with the fire, it goes more than just the actual air monitoring and the burning during the fire because of remediation and overturn, which deals primarily with the firefighters.

But during the fire itself -- and this was documented in the RAC report, and I cited it -- for three days, the air monitors were shut off when the fire was burning most on Los Alamos property.

Prior to that and after that, the particulate matter that was in the air clogged up the filter so that the accuracy of the filters was changed by an order of magnitude. I believe that's referenced as well as far as the accuracy of what was done.

Additionally, they also changed the changeout parameters from the filters because normally it's a two week parameter. But there's so much particulate in there they

had to change them out every day.

So I think you have to question the accuracy of the data for the air monitoring for those of us who were present during the fire.

And, further, the soil is affected by the fire because the heat tends to evaporate all the moisture out of the soil. It dries it out even more. Plus, it changes the chemical composition of the soil. So it doesn't hold moisture. Moisture just tends to run off. And that's why you have a big fear of flashlighting. But it also affects the resuspension aspects of it.

And for firefighters, it's a big issue because they're going back after the fire has burned through the area. And they're turning soil over. They're looking for fires that are in roots underground that could flare up and then release burning embers. So they go back. And they try to turn stuff over in

order to make sure the fire doesn't come back.

The fire actually took place until the middle of July. It was not out until July. It was contained. And it took a number of weeks to even contain the fire. So you're looking at a longer term after that.

Plus, you're still dealing with the resuspension issues in those areas, even if the fire is out. If people are working in those areas, say laborers or whoever, then you still have the resuspension issues.

All right. And, last, I would kind of like to refer to the similarities between us and NTS considering that NTS has just been adopted or included into the Special Exposure Cohort.

And these issues did come up today; as you recall, the sampling rationale consistency, the data gaps in the fission products and the number of records. And if you look at the data set for the in vivo,

you'll see that there are gaps in that data. There are not a large number of records in there.

One portion of the NIOSH rationale is, "Well, we've got the in vivo data, and we can do dose reconstruction." But you've got such a small data set for a number of items you have, you know, I think a better explanation needs to be made about how those are going to be used in order to reconstruct dose.

We also discussed the nature of work, which was another issue of NTS, the short-term campaign-driven. And here we're talking about episodic issues at LANL, episodic exposures and then the nuclide source term. And I've kind of touched on some of those issues there.

I feel that a lot of the action items that were discussed today pretty much cover the issues that I have just raised. So

this is basically just a summary of what was discussed today. But I still think that the firing sites and the fire need to be addressed a little bit better because of the materials that were handled there and the way that the monitoring was done.

And I think as far as -- I think Joe has pretty much captured the issue of worker records, but I think those have to be looked at as well because in my position, for a large number of years since I -- probably about the first eight years, all we recorded was a pay code, four hours work. We didn't record locations that we worked at. We just recently started including those a few years ago on our time sheets, which are, you know, a record of activity.

For the other crafts workers, a lot of times they are working different job sites during the day or it just depended on where they were because theirs was episodic in

nature as far as the work that they had to do, "Well, we need you to go over here and fix this." And it may take a period of weeks or it may only take a day.

So it depended on the nature of the work that they were doing how long they were in a particular area. And I think that needs to be looked at if you're going to tie -- to do dose reconstruction, you're going to have to tie exposure to exposures, and that is how you're going to do it. The question is, are those records adequate in order to tie a person to a particular area in order to determine their dose?

I believe that's all that I have to say today. Thank you for the opportunity.

CHAIRMAN GRIFFON: Thank you for your in-depth comments. I really appreciate it. I think I captured most of it. I will certainly work with Joe and with you guys and with you, Andrew, to make sure I captured

everything correctly.

One followup I had so I understand it is the question on the badge access or the badge readers that you were talking about. I guess I'm trying to figure out what the issue here is. Is the issue that the guards, in particular, could access areas without having dosimetry --

MR. EVASKOVICH: No, not dosimetry. The identification --

CHAIRMAN GRIFFON: The ID badge.

MR. EVASKOVICH: Not dosimetry.

CHAIRMAN GRIFFON: So you wouldn't know that they were in that area. Is that sort of the --

MR. EVASKOVICH: Well, yes, --

CHAIRMAN GRIFFON: Okay.

MR. EVASKOVICH: -- because a lot of it is key access.

CHAIRMAN GRIFFON: Right.

MR. EVASKOVICH: We have key

access --

CHAIRMAN GRIFFON: You have to have a security badge, not necessarily a dosimetry badge, right?

MR. EVASKOVICH: Yes, security badge, identification, security badge, because they had the magnetic stripe on them. And you run the stripes through a reader, just like the readers on the doors for the hotel room. You run the badge on there. And you can either release the turnstile or release the lock on the door or in some cases --

CHAIRMAN GRIFFON: Right.

MR. EVASKOVICH: -- it just flashes a red or a green light in order --

CHAIRMAN GRIFFON: So they could be in and out of buildings and there would be no necessarily record of it. Is that what you're getting at?

MR. EVASKOVICH: Yes.

CHAIRMAN GRIFFON: Okay. I have

the issue.

MEMBER BEACH: They don't collect that data?

MR. EVASKOVICH: Well, that's what I'm -- I don't know whether or not on some of these badge readers to some of these areas, I don't know whether or not the badge readers actually capture that data because it's more to determine whether or not they're trained.

CHAIRMAN GRIFFON: I'm not sure you're going to use that anyway. But yes, I just wanted to clarify what the --

MR. EVASKOVICH: For access into areas because it seemed to be a question today, you know, tying a person to an area in order to determine whether or not they were exposed. So that is a possibility, but if it is kept, it is going to be a lot of data. It's going to be a lot of information there.

CHAIRMAN GRIFFON: I think --

MR. EVASKOVICH: Electronically,

if it's kept paper, even paper data is very large because we have logging where I work out now. And we go through several pages a day now because we have extra people working in the area because of construction.

CHAIRMAN GRIFFON: And I think NIOSH's approach is going to be you may have to tie workers to areas but not necessarily -- because I asked that question earlier on the checklist and those things -- not necessarily place by place, individual by individual. They're going to look at I think job categories and other --

MR. EVASKOVICH: Right.

CHAIRMAN GRIFFON: Yes.

DR. NETON: It would be rare to be viewed as an area-specific dose reconstruction unless it's very obvious from the data that we had in --

CHAIRMAN GRIFFON: And then for guards, they'll have to make a certain

criteria of how --

DR. NETON: Right.

CHAIRMAN GRIFFON: -- how conservative to be since they went in and out of a lot of buildings. I think that will be your assumption. I don't want to put words in your mouth, but --

MR. EVASKOVICH: Right, right. Even probably to develop the data set or whatever for your model, I still think that information -- you know, it might be very large depending on what is available. And then in the earlier years, I'm not too sure how the -- if everybody was logged in and out of areas or not or if was just a badge check to access the area --

CHAIRMAN GRIFFON: Right.

MR. EVASKOVICH: -- before electronics or the electronic badge readers. It's a paper log. Was it maintained or was it just a badge check?

CHAIRMAN GRIFFON: Right. Okay. And I think I captured most of your other -- I mean, the two big ones that you reinforced with, the question of the exotics and the firing range. I don't know if there's anyone at NIOSH that has any -- you're going to look? Okay.

And then the other as far as the issues that you very well-articulated on the fires --

MR. FITZGERALD: I had just a comment on fire. You know, I saw that mentioned petition needing review. DOE or the Site obviously came up with in a sense almost probably a bounding dose to assign the firefighters, the people that are involved in the fire.

And I think your concern is whether that was conservative enough given what everybody had to do in turning over soil, being exposed to contaminants that you weren't

being given credit for or something. So the sense was that it wasn't in the dose record for those involved, but it may not have been as conservative as you believe it should be.

CHAIRMAN GRIFFON: And the question on the accuracy of the monitoring data, you --

MR. EVASKOVICH: There is that. And you really can't use coworker data for that because the laboratory was shut down. And Los Alamos was evacuated. So the people that were on the bioassay program probably the majority of them, they weren't present during the fire in order to have anything show up in the bioassays.

MR. MACIEVIC: Well, one thing that I can tell you is that were are currently working on a White Paper on the Sierra Grande fire to try to --

MR. EVASKOVICH: Okay.

MR. MACIEVIC: -- look at the

doses from that particular incident and see how they jibe with what other activities were going on.

MEMBER LOCKEY: Was there virtual sampling going on in firefighters?

MR. MACIEVIC: No.

MEMBER LOCKEY: No?

MR. MACIEVIC: There was air sampling, not from the individual.

MEMBER LOCKEY: There was air sampling?

MR. MACIEVIC: Yes, air sampling. And there was some other sampling going on, but --

DR. NETON: There was no bioassay quantifier?

MR. MACIEVIC: That I can't say for sure, but there wouldn't have been.

MR. EVASKOVICH: Well, I say that based on, you know, just from talking to the firefighters. And they said, no, they didn't

bioassay after the fire.

MR. STEWART: Actually, we had found that out, too, in some outreach meetings with them. And the other problem is even if they did bioassay a few of them, they had very large numbers of departments that responded, have a very large cross-section of people, representative.

MEMBER LOCKEY: What was the air sampling done? What would be your sample?

MR. MACIEVIC: They had air samplers around. They had what? Don, didn't they have air samplers upwind and downwind of the fire? And they had them at several of the facilities depending on the direction the fire was going to be moving.

So there are several locations where the --

MR. STEWART: There are a number of locations. And I think our approach for the White Paper was just simply take the

largest concentration from all the results.

MR. EVASKOVICH: I think some of those were EPA air models. So, from what I understand from the RAC report, there are different standards or different things that they were looking for in the air monitoring.

MEMBER LOCKEY: Okay.

MR. EVASKOVICH: So there were some issues concerning that as well as far as the accuracy of the air monitoring during the fire because of that.

I think you're going to need to reference the RAC report for sure. And it discusses the fire and the air monitoring in there. I kind of picked out the little nuggets to apply or at least I think applied. There is a lot of information in that report.

MR. STEWART: Yes. That is our basic reference for that White Paper.

CHAIRMAN GRIFFON: All right. Great.

MEMBER LOCKEY: We just finished a study on urban firefighters of Underwriters Laboratory. And 100 percent of the particulates won't get found. So unless you're sampling for it, you don't see it.

MR. FITZGERALD: I guess the other question, just skipping over to the firing sites, that's maybe perhaps a Site Profile question, where you wanted to at least acknowledge that beyond the uranium, you have the potential for the exotics to be as well in that location.

It sounds like Bob -- was it Bob Burns?

MR. MACIEVIC: Bob Burns and Don Stewart.

MR. FITZGERALD: It sounds like he was the source of that information. I think the only issue there would be simply to make sure that that wasn't along with the --

CHAIRMAN GRIFFON: Where you would

use that sort of coworker approach, right, right.

MR. FITZGERALD: Yes, yes.

CHAIRMAN GRIFFON: Assuming the coworker --

MR. FITZGERALD: Yes. Right, right. That would just be another reflection of additional source involved with that.

CHAIRMAN GRIFFON: Yes, yes. Okay. Is there anything else for today? Anyone? I will try to turn these action items around fairly quickly because I don't want to lose track of my train of thought --

DR. NETON: It's happened before.

CHAIRMAN GRIFFON: It has happened many times, yes. But I will try to send these around and first probably to NIOSH. Greg, I guess you would be the point of contact and Joe for SC&A and Ted, you and probably, Fran, because I want to make sure I captured your issues as well. And then I'll circulate them

around to everyone after that.

I think that's it unless anybody else has anything for the record.

MR. FITZGERALD: Well, the only thing I had I would say for the record is Andrew had a question about our report. And I just want to verify it's in the Privacy Act. We do. And subject to that being completed, it would be presumably available.

MR. KATZ: To the public.

CHAIRMAN GRIFFON: To the public, right.

MR. MACIEVIC: I have a question for you, Mark. If this is the short meeting, what is the long one?

(Laughter.)

CHAIRMAN GRIFFON: The short one? Relatively short. Oh, yes.

MEMBER BEACH: Two days for Wanda's meetings. They run until 5:00.

PARTICIPANT: Yes. They go to

5:00 and 5:00 and beyond.

CHAIRMAN GRIFFON: Wanda never lets you out by 3:00. I know that. Thank you.

MEMBER MUNN: Yes. When I say, "5:00," I mean 5:00.

DR. NETON: I hope you're feeling better.

CHAIRMAN GRIFFON: Wanda, you're the Bionic Woman. I know that.

MEMBER MUNN: Hey, I'll have all these new knees to go off when I see you next. Thanks.

CHAIRMAN GRIFFON: Okay. I think we're ready to adjourn. Thanks everyone. And have a good weekend.

MR. KATZ: Take care, everyone on the phone. And thank you.

(Whereupon, the above-entitled matter was concluded at 2:46 p.m.)

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