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

convenes the

WORKING GROUP MEETING

ADVISORY BOARD ON

RADIATION AND WORKER HEALTH

NEVADA TEST SITE

The verbatim transcript of the Working Group Meeting of the Advisory Board on Radiation and Worker Health held telephonically on December 19, 2007.

STEVEN RAY GREEN AND ASSOCIATES
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C O N T E N T S

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TRANSCRIPT LEGEND

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-- (sic) denotes an incorrect usage or pronunciation of a word which is transcribed in its original form as reported.

-- (phonetically) indicates a phonetic spelling of the word if no confirmation of the correct spelling is available.

-- "uh-huh" represents an affirmative response, and "uh-uh" represents a negative response.

-- "*" denotes a spelling based on phonetics, without reference available.

-- (inaudible)/ (unintelligible) signifies speaker failure, usually failure to use a microphone.

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(By Group, in Alphabetical Order)

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ARENT, LAURIE, ORAU
CHEW, MEL, ORAU
ELLIOTT, LARRY, NIOSH
FIX, JACK, ORAU
HARRISON-MAPLES, MONICA, ORAU
HOFF, JENNIFER, ORAU
HOMOKI-TITUS, LIZ, HHS
KOTSCH, JEFF, DOL
MAHATHY, MIKE, ORAU
MAKHIJANI, ARJUN, SC&A
MAURO, JOHN, SC&A
OWENS, KATHLEEN, SEN. REID
ROLFES, MARK, NIOSH
ROLLINS, GENE, ORAU
SMITH, BILLY, ORAU
ZLOTNICKI, JOE, SC&A

P R O C E E D I N G S

(11:00 a.m.)

WELCOME AND OPENING COMMENTS

DR. BRANCHE: Mr. Presley --

MR. PRESLEY: Yes -- Presley.

DR. BRANCHE: -- are you ready to get started?

MR. PRESLEY: I am.

DR. BRANCHE: Okay, then let's do this -- let's get this puppy rolling. This is a conference call for the working group of the Nevada Test Site site profile. I'm Dr. Christine Branche from NIOSH, Office of the Director. I'm going to call out the names of the members of the Advisory Board, if you could please acknowledge your presence.

Mr. Robert Presley?

MR. PRESLEY: Here.

DR. BRANCHE: Mr. Clawson?

MR. CLAWSON: Here.

DR. BRANCHE: Ms. Munn?

MS. MUNN: Here.

DR. BRANCHE: Dr. Roessler?

DR. ROESSLER: Here.

DR. BRANCHE: Mr. Schofield?

MR. SCHOFIELD: Here.
DR. BRANCHE: Mr. Rolfes from OCAS.
MR. ROLFES: Correct, I'm here.
DR. BRANCHE: Dr. Makhijani from SC&A.
DR. MAKHIJANI: Here.
DR. BRANCHE: Okay. Are there other Board members who are participating in the call? If you can please acknowledge.
(No responses)
NIOSH staff, other than Mr. Rolfes, who are also on the line, would you please acknowledge?
MR. ELLIOTT: Larry Elliott.
DR. BRANCHE: Lew Wade, are you on the line yet?
(No responses)
Okay. Are there other ORAU staff?
MR. MAHATHY: Well, Mike Mahathy.
MR. CHEW: Mel Chew, ORAU team.
MR. PRESLEY: Good morning, Mel.
MR. FIX: Jack Fix, OR-- ORAU team.
MR. SMITH: Billy Smith, ORAU team.
UNIDENTIFIED: (Unintelligible), ORAU team.
DR. BRANCHE: Okay.
MS. HOFF: Jennifer Hoff, ORAU team.
MS. HARRISON-MAPLES: Monica Harrison-Maples,

ORAU team.

MR. ROLLINS: Gene Rollins, ORAU team.

MS. ARENT: Laurie Arent, ORAU team.

DR. BRANCHE: I just realized -- again, please forgive me, this is -- I'm still getting used to this. Those of you from NIOSH and ORAU who mentioned your names, do any of you have a conflict with Nevada Test Site? If so, please sa-- please say so now.

MR. SMITH: Billy Smith, conflicted.

MS. ARENT: Laurie Arent, conflicted.

DR. BRANCHE: Are there other SC&A staff participating, and if so, would you please say so and if you have a conflict?

DR. MAURO: Yes, this is John Mauro. I'm with SC&A and I have no conflicts.

DR. ANSPAUGH: This is Lynn Anspaugh with SC&A, conflicted.

MR. ZLOTNICKI: Joe Zlotnicki with SC&A, no conflicts.

DR. BRANCHE: Are there staff members from other federal agencies who are participating on the call? If so, please state your name.

MS. HOMOKI-TITUS: This is Liz Homoki-Titus with HHS.

MR. KOTSCH: Jeff Kotsch with Department of Labor.

DR. BRANCHE: Hi, Jeff.

MR. KOTSCH: Good morning.

DR. BRANCHE: Are there petitioners or their representatives on the -- on the call who would like to announce their names? If so, please do so.

(No responses)

Are there workers or their representatives who would like to announce their names?

(No responses)

Are there members of Congress or their representatives who would like to announce their names?

MS. OWENS: This is Kathleen Owens with Senator Harry Reid's office.

DR. BRANCHE: Thank you. And are there others who would like to mention their names who are participating on the call?

(No responses)

Okay. Before I hand it over to Mr. Presley, I'd just ask that because this is a conference call, we do ask that if you are not speaking that you please mute your line, and then when

you are ready to speak please make sure you un-mute. And so I thank you for that telephone courtesy. Mr. Presley, you're ready to begin.

INTRODUCTION BY CHAIR

MR. PRESLEY: Thank you very much. Larry, did you send the letter -- have you had time to send it to the Board members since they didn't get it? Did you send anybody an e-mail?

MR. ELLIOTT: Yes, Dr. -- Mr. Presley. This is Larry Elliott and I apologize. I had included everybody on your working group in that e-mail I sent on Monday afternoon at 2:07, but for whatever reason I guess it didn't get to you so I've resent it again here just a moment ago.

MR. PRESLEY: Yeah. Yeah, I'm -- I'm -- I've been looking for the cover sheet and yeah, everybody's on there.

MR. ELLIOTT: And John Mauro, I cop-- I had you on that e-mail. I don't know if you got it or not, I didn't hear you say you didn't so I didn't include you on the one I sent this morning.

DR. MAURO: No, I haven't checked my e-mail this morning but that -- I will check it now. I just sat down this moment.

MR. ELLIOTT: Do you know if you got the one I sent Monday?

DR. MAURO: Okay, hold on, I'll let you know -- on -- on Monday?

MR. ELLIOTT: Monday at 2:07 in the afternoon is when my screen shows I sent it.

DR. MAURO: Okay.

DR. MAKHIJANI: Larry, if it's about NTS, could you send it to me? This is Arjun.

MR. ELLIOTT: Surely.

DR. ROESSLER: Yes, Larry, this is Gen, I -- I'm getting other e-mails from you. I got one with regard to Bethlehem Steel and I got one -- it's the [Name redacted] response letter, but I don't have the one you're speaking of.

MR. ELLIOTT: That's the exact one I'm speaking of.

MR. PRESLEY: Yeah.

DR. ROESSLER: Oh, it's the --

MR. ELLIOTT: But please let's not mention names here.

DR. ROESSLER: Oh, I'm sorry, I was going by the subject line here.

MR. ELLIOTT: The one that we're talking about is a particular claimant's set of comments that

have been provided to us on Nevada Test Site, and our reaction to those comments. And there's three attachments. There's a letter to that individual, and then there are two matrices attached.

DR. ROESSLER: I have it, and perhaps others haven't recognized it, either.

MS. MUNN: I do, too.

DR. MAURO: I al-- Larry, I also have received it, yes.

MR. ELLIOTT: And John, would you send it to Arjun or do you want me to send it to Arjun?

DR. MAURO: I will -- I will take care of that.

MR. ELLIOTT: Okay. My apologies, Arjun. I just -- I assumed that Dr. Mauro would provide it to whoever on SCA staff needed it, but...

DR. MAKHIJANI: No problem.

MR. ELLIOTT: Okay. So everybody does have that bit of information. I apologize for the confusion about the subject line, but we should avoid using personal identifiers. But yet this information was provided to us as a worker comment about our site profile. And as you would see in our letter, we -- we told him we were going to present this information to the

working group and that person could listen in today if he so chooses to do so, but apparently he hasn't, and it looks like to me in my correspondence with him of late, he will see you all at the Board meeting.

DR. BRANCHE: Well, let's just make sure. Is there any petitioner or their representative or worker or their representative who's joined the call who would like to announce their name?

(No responses)

Was that a response?

MS. MUNN: No, it wasn't. That was my computer saying (unintelligible) --

DR. BRANCHE: Okay, thank you. Mr. Presley, please proceed.

MR. PRESLEY: All righty.

DR. WADE: This is Lew Wade. I'm with you. Sorry I was a bit late, but I'll be with you for some of the time but not all of it, but Christine is here.

MR. ELLIOTT: I want it clearly understood that this individual we're talking about is a claimant, is not an active petitioner, but we -- whether petitioner or claimant, we still need to maintain that person's privacy unless he

wants -- or she wants to identify themselves. Thank you.

MR. PRESLEY: Larry, thank you very much. The letter states, and -- and I will read this and then we will go on to Mike Rolluf (sic) for the matrix. It says your input was provided to the health physicist for review and consideration. Relevant issues which may affect the outcome of the NIOSH dose assessments are actively being incorporated into the revision of the NTS Technical Basis Document which are used for dose reconstruction under the EEOICPA and that plainly states that the information that this gentleman sent was used, and we will so note that.

Mark?

MR. ROLFES: Yes, Bob.

MR. PRESLEY: If you would start, I would like for you to go through the matrix that you sent out. And one thing I want to say before we get started, Mark has done an excellent job on putting this matrix together and taking two matrix (sic) and putting them into one with all the -- all of the information on here.

MS. MUNN: It was very helpful.

MR. PRESLEY: Very, very helpful to read this thing.

DR. ROESSLER: Bob, just to make sure we're looking at the right thing, tell me when -- I have two e-mails from Mark and on the 17th -- I want to make sure I'm looking at the right thing.

MR. PRESLEY: Okay, this is the one that -- that I have that's marked 12/16/07, final document --

DR. ROESSLER: Okay --

MR. PRESLEY: -- NTS --

DR. ROESSLER: -- I have it.

MR. PRESLEY: -- NTS site profile matrix.

DR. ROESSLER: It's got -- I have it, thank you.

MR. PRESLEY: It's 18 pages.

DR. ROESSLER: Uh-huh, okay, thanks.

DR. MAKHIJANI: Mark, did you send that to me?

MR. ROLFES: Yes, I did as well.

MR. SCHOFIELD: Mark, this is Phillip Schofield. Could you resend that to me? For some reason I did not receive that. I've got Larry Elliott's -- the one he sent out.

MR. ROLFES: Okay.

DR. MAKHIJANI: I've got your 3-page document with the doses from '63 to '66 --
MR. ROLFES: Okay.
DR. MAKHIJANI: -- but I don't have a new matrix.
MR. ROLFES: Okay, let's see, I had sent one e-mail at 9:30 a.m. on 12/17 and the other one at 9:51 a.m. on 12/17.
DR. MAKHIJANI: Is there a different e-mail address?
MR. ROLFES: Is there a different e-mail address?
MS. MUNN: No, they were the same.
DR. MAKHIJANI: Oh, no, I'm looking in the wrong file. Sorry.
MR. ROLFES: Let's see --
DR. MAKHIJANI: Okay, I was in the wrong (unintelligible).
MR. ELLIOTT: Arjun, your e-mail address was on the 9:30 and the 9:--
DR. MAKHIJANI: Yeah, I -- I'm looking in the wrong box.
MR. PRESLEY: Arjun -- Arjun's on here.
DR. MAKHIJANI: Yeah.
MR. ROLFES: Okay, let's see. I did just send

that --

DR. MAKHIJANI: Yes, I -- I got it. I just -- sorry, I was looking in the wrong place.

MR. ROLFES: Phil, I did just resend that e-mail to you. Please let me know if you don't receive it shortly.

MR. SCHOFIELD: Okay.

MR. PRESLEY: Okay, is everybody ready for -- for Mark to start?

MS. MUNN: Yes, although I do have to apologize for not having downloaded the proper information at the right time. I haven't had an opportunity to read that e-mail that we were confused about with respect to the heading, so apologies for that, but carry on. We'll follow on the screen.

NTS SITE PROFILE MATRIX:

MR. ROLFES: Okay. Well, if we'd like to go through the matrix items, we can certainly do that. I don't know, Bob, would you like to read the SC&A comment first and then we can provide our -- our NIOSH response and the status of that response?

MS. MUNN: So which matrix are we working from?

MR. ROLFES: This -- I apologize, this is the

NTS -- it's titled "NTS Site Profile Matrix, 12/16/07, Final," and --

MS. MUNN: All right, very good, the one that's easiest to follow.

MR. ROLFES: The consolidated matrix. I do want to explain that we did take two separate matrices from the last meeting that we had with the Advisory Board and consolidated all those issues. Some of -- some of the issues were the same between the two matrices. However, one of the matrices was created in response to SC&A's comments on an expanded review of the external dose TBD. We have incorporated that separate matrix into the main matrix and consolidated things for -- to make things a lot more efficient, so...

COMMENT ONE: INCOMPLETE RADIONUCLIDE LISTS

MR. PRESLEY: Okay, we'll start with the first find-- or the first comment, and number one is some radionuclide lists are not complete, and we had one finding and then we had an issue of 5.1 SC&A put out, and Mark, I'll let you read the responses and we'll go from there.

MR. ROLFES: Okay. And within our Nevada Test Site Technical Basis Document Table 2-2 we

revised that to include chlorine-38, aluminum-28 and scandium-46. Let's see, don't know if it's necessary for me to read through -- everybody is able to see what our response is. We feel that the status of this item is in fact closed. We did incorporate additional radionuclides into -- into the tables. Let's see -- let's see, I --

MR. PRESLEY: Well, this -- we have talked about this three or four times, and on my last matrices we had marked that thing closed and I would presume that everything's been done. We've -- y'all have added or removed stuff from the -- Table 2.8 and -- that SC&A has asked about, and I think they -- you all have complied and SC&A has said that they agree with everything on this. Is this correct?

DR. MAKHIJANI: Well -- well, we -- we haven't been authorized to review any of the changes except the external dose piece that you asked us to review. The -- the -- I know the -- the entire second -- volume two or chapter two of the TBD has been redone, but Mr. Presley, we haven't been authorized to review that so we haven't rev-- from -- from the point of view of

NIOSH having responded, it's correct, it's closed, but we have not reviewed it, just for the record.

MS. MUNN: Bob, my notes show me from our last meeting on October 25th, I believe --

MR. PRESLEY: Uh-huh.

MS. MUNN: -- that the only outstanding item there was for this group to check for completeness, and I don't know whether as a group that's occurred. I did take a very quick look at it looked complete to me, so...

MR. PRESLEY: Yeah.

MR. CLAWSON: Bob, this is Brad. One of -- one of the questions I have is, you know, we have put these out and NIOSH has made these changes, but to me, SC&A has not still reviewed these items and they were the ones that brought up many of the issues on this.

MS. MUNN: Since we've responded to them -- if we had the response and the action was for us to check and feel that it was complete. And you know, we can go back and forth forever with -- with additional material for our technical contractor, but they've already looked at this, identified what they wanted to have happen, and

Mark has said that it's been done. We have looked at it. It's done. There's no -- bringing any other rock seems inappropriate.

MR. CLAWSON: Well, and I understand that, Wanda. That'd be like me taking my car in and telling them to fix something and then walking off and never making sure that the whole problem was ever really taken care of. I know that some of these radionuclides have been put in there, too, but in Table 2-A with the TBD -- you know, we -- I'm -- I'm sorry, I can't put all that much time into these and so forth like the -- and it's kind of interesting to me if we have SC&A raising these concerns, one of the -- one of the conclusions that we have to come to is as the Board members, correct, but we've got to make sure that also that their issues were addressed fully and to the -- to the satisfaction we can do, and that -- that's all I want to make sure.

MS. MUNN: Well, I guess I need to hear from SC&A on this point. Is this -- are you telling us that in order for you to agree that the work has been done that was requested, you have to perform an additional review function? Is that

what I'm hearing?

DR. MAURO: This is John Mauro. Maybe I could help out a little bit.

MS. MUNN: That would be helpful, John.

DR. MAURO: Yeah, as a precedent, I us-- I usually go back to the -- when we first engaged this issue and that was with Bethlehem Steel where we brought up -- identified six issues. The issues were dealt with by white papers.

MS. MUNN: Uh-huh.

DR. MAURO: Eventually we all agreed yes, we've reviewed the white papers, they -- these do resolve all the issues and then we edited it at that point. Six months later a revised Bethlehem Steel site profile was issued that was represented as, you know, addressing -- containing all the new material that was in the white papers and we were never asked to review it. So this is really a matter that I guess if we want to go to precedent, that was found to be an acceptable way to achieve closure. However, certainly if at any point in time the working group or the Board says that, you know, please go back and take a look, I mean we would look at it. But no, we -- we -- to date, it's

really been on a case-by-case basis.
With regard to procedures, in that working group when we find that the -- NIOSH has responded in a way that says yes, I have addressed the procedure in the following way and there's a white paper, I -- I believe what we call that now is it's in abeyance.

MS. MUNN: Yes.

DR. MAURO: Whereby that means that okay, looks like it's resolved, but it'd probably be a good idea to take a look at the procedure after it has been revised.
So in a way we -- we have not really come to a uniform approach across the board on how we're going to deal with final closure. And certainly we will take our lead from you folks. Right now we have certainly reviewed the material that was exchanged and as Mark correctly points out, the issues have been resolved from that perspective. And really it's really a question now to the working group of whether or not you want to hold this in abeyance for review or -- or -- as we're doing sort of on the procedures, or -- or say really it's closed, as we did with Bethlehem Steel.

So I -- I think that sort of sets the framework.

DR. MAKHIJANI: Well, let me -- let me kind of maybe throw a specific in there -- Mark Rolfes might help me out. I'm looking at our original site profile review from December 2005 --

MR. ROLFES: Uh-huh.

DR. MAKHIJANI: -- and the three that you added are in that list which we -- of activation products which we said were not -- the original table. There were also a number of others, like neptunium-239. I don't know what happened with that one, for instance. So we haven't -- yeah, the three have been added. There were -- there were three that we called out, but we don't know what happened to the others or whether the list is complete or whether the Board wants us -- the working group wants us to investigate that.

MR. ROLFES: Okay. This was not meant to be a listing of all radionuclides that could have been produced, but these are the radionuclides that were of dosimetric importance based on REECo's historical information during the testing era.

DR. MAKHIJANI: Right, and what I'm saying is if -- that we've identified a number of them and we have not reviewed either your basis for concluding that these were the only ones of dosimetric importance and why the other ones that were called out were not included and what the relative merits of these things are. So for -- for example, the chlorine-38 has a half-life of 37 minutes but neptunium-239 has a half-life of more than two days, and so -- anyway, we -- we -- we have not looked at the NIOSH basis from the point of view of NIOSH saying they've done something. NIOSH has done something, but we have not reviewed that and we've not been asked by the working group to review that.

DR. WADE: This is --

DR. MAKHIJANI: But the working group may itself review it, so this -- this is fine. I mean I'm just making a statement of fact.

DR. WADE: Well, this is Lew. Maybe I could speak just briefly to this issue generically. I mean the -- the final say on whether or not an item is closed or not rests with the working group. Eventually it rests with the Board.

SC&A is there to assist the working group as it feels it's necessary, and in some cases after one iteration it might be clear to the working group that an issue is closed and they could so decide. They might decide in another case to go back to SC&A and ask for another review. I mean it's a -- it's a matter of judgment. The other thing turning against this is that we are looking at (unintelligible) that can strain SC&A's activity possibly as we -- as we go through this year, so working groups need to be mindful of that and decide -- issues rise to a certain level that they need to be looked at again, then so be it, they need to be looked at again. If the working group feels it can make the call, fine. Again, the -- the working group can differ on that and then the chair can decide if the chair would want to hear from each working group member to vote to try to reach some kind of consensus. But it's an issue that we'll face many times and, you know, working group members just have to decide if they're ready to make a call or if they need another iteration by their contractor.

MR. PRESLEY: This is Bob Presley. I wish I

had my minutes in front of me from about four or five meetings back, but this is one of the issues that we took up first. It was completed, and if I remember correctly, this was one of the first issues that we marked off of this thing.

Now you know, we were -- we've got our comments, and as far as I'm concerned, you know, SC&A has -- they have made their review of the comments and they made their recommendations. HHS has come in or CDC has come in -- and NIOSH and have made the changes. We have had a couple of meetings to talk about these changes and my estimation, this particular comment is closed.

MS. MUNN: It appears that the remaining issue really is whether or not SC&A can, without full review, accept the assertion here that the REECo nuclides that were identified of dose concern is a reasonable assessment. If that's a reasonable assessment, then there -- there does not appear to be any remaining issue. Does SC&A have a position with respect to the REECo information?

DR. MAKHIJANI: Ms. -- Ms. Munn, we haven't --

we haven't -- you know, we haven't reviewed the basis of the statement that NIOSH is making that these are the only three that are of dosimetric importance among the activation products mentioned -- original list of activation products that SC&A had in its review was not drawn from -- was not an arbitrary list. It would -- it was drawn from the National Academy of Sciences' report on the Nevada Test Site. And so I presume that the National Academy's list was a well-considered list, and so all -- all I'm -- I'm just putting the facts before you that we had a list of radionuclides that was suggested for consideration for inclusion. We have not seen the technical basis for including or excluding certain radionuclides from that list. Of course it's the pleasure of the working group, you know, what to do with the list that we gave you and what to do with the list that -- that NIOSH has given you. It's -- it's -- I -- I just don't know how to comment more than that.

MS. MUNN: Well, I -- I think what I got from -- I believe what you just said was you're working from an NAS list and the suggestion of

the resolution works from the REECo list from 1993. The only -- then that raises in my mind the question does our contractor not feel that the REECo list is acceptable?

DR. MAKHIJANI: One would have to examine the technical basis of saying that the other radionuclides are not dosimetrically significant. We --

MS. MUNN: But that's what REECo has said.

DR. MAKHIJANI: -- we neither looked at the original -- when -- when we did the review we didn't go to the underlying calculations that the National Academy had done. We presumed that they had -- they had done a good job. Now maybe REECo had good reason to -- to reject certain ones. All I'm saying is that we haven't reviewed that and it would not -- it would be a little bit arbitrary for us to say REECo's right and National Academy's wrong, or National Academy's right and REECo's wrong, without actually going and looking at the technical basis. Now if the working group has done that and feels -- feels okay, then that's fine with us, but we haven't done that.

MS. MUNN: So you didn't look at REECo really

at the time that you were doing your review.

DR. MAKHIJANI: No, this -- this is an-- this -- this is a list that has been added by NIOSH and we -- we presented a list from the -- well, it's -- the citations are there in our review from December 2005.

MS. MUNN: Yeah, and I -- I didn't go back to those other citations, but REECo is not included in those?

DR. MAKHIJANI: Well, I don't know what all we looked at. The citation -- I'm just looking at the footnote to the table as to where this particular Table 1 on page -- let me see -- 25 of our December 2005 review. That table certainly was footnoted NAS 1989, page 31.

MS. MUNN: Yes, and then the REECo --

DR. MAKHIJANI: I don't know elsewhere -- I -- we looked at the REECo list, I don't recall right now because I have not -- I have not reread our review, unfortunately.

MS. MUNN: And I haven't -- I don't have the citations in front of me, either. I don't have the document here, but I -- it would be simple -- one would I think safely conclude that a report which follows the NAS one would be of

enough interest to have been reviewed during the period of the initial review.

DR. MAKHIJANI: Well -- well, you know, I -- I do not know what -- what all radionuclides are on the list. I think -- I think that the question is that REECo found -- that NIOSH found them to be dosimetrically significant, and Mark has looked at it more recently and he should comment on that, but -- but clearly I -- you know, I personally don't feel comfortable in saying that -- one list or another. I don't know -- REECo examined the National Academy report thoroughly and -- and redid the calculations and made its evaluation, I just don't know that. And it's -- I'm -- I'm just trying to be as factual as possible --

MS. MUNN: I understand. I understand.

DR. MAKHIJANI: -- in terms of what we did and what the issue is.

MS. MUNN: I understand that, and I'm trying to define the -- the essence of the issue down to its very essence so that we can see what specific point we're talking to. And from my perspective right now, it looks to me the point is whether the original review by our

contractor included the REECo study; and if it did, whether it concluded that the REECo study was also a valid one. And I don't know -- Mark, can you speak to that at all?

MR. ROLFES: Well, what I was going to comment on is that what our table does have within the site profile, the radionuclides of concern for various Nevada Test Site activities. There are approximately 80 radionuclides of concern, and each of those radionuclides we have documented the time periods that they're of concern, the time period following the test, and the area of Nevada Test Site where they are in fact a concern. If SC&A has additional information to provide to us, we will be sure to consider that as well. And also if we receive additional information regarding some other radionuclide that we do not currently have knowledge of, we'd be happy to incorporate that into our living site profile. So --

DR. MAKHIJANI: And I'd also supplement what Mark just said by noting that in NIOSH's own response it says these radionuclide lists of REECo may not be comprehensive, but the lists have been reproduced in this TBD as published

by REECo. So you know, I -- we're happy to stand pat as it is. I'm just trying to say factually what has happened and what NIOSH has put on the table is just a partial list, just comparing it to our original list. That's it.

MS. MUNN: Yes, I -- I understand that.

DR. MAKHIJANI: (Unintelligible) a very satisfactory (unintelligible).

MS. MUNN: It seems that it's incumbent upon us as a workgroup to make the decision whether the assertion that the radionuclides that are of dose concern have been now incorporated in the table. That's really the bottom line, I believe.

MR. PRESLEY: This is Bob Presley. That's correct. And to my knowledge, they have been incorporated.

MS. MUNN: I have not done the calculations. I'm not capable of doing the calculations.

MR. PRESLEY: Me either.

MS. MUNN: But from the previous discussions that we've had, it would appear that -- that significant radionuclides have been included. And as the agency points out, these vary from one test to another and from one time frame to

another. I'm willing to accept it as-is.

MR. PRESLEY: Anybody else got any comment?

MR. CLAWSON: Bob, this -- this is Brad. I guess -- I guess maybe this is coming up because of a -- some of my issues in -- in Fernald and stuff like that. But part of my issue is -- and my frustration, I guess, from trying to figure out how -- how we really come to closure with these because when -- when we have a review and we have SC&A come in and review these things, and then we have NIOSH do -- you know, they may do 65 percent of what was said, they may do not -- they may say, you know, that they don't have to. I'm trying to figure out -- and excuse my ignorance, but I'm trying to figure where we come to a complete close on this to make sure that everything has been done because a lot of times when NIOSH has changed something, it's -- sometimes we get it changed two or three different places in a site profile or -- or anything else like that. And I realize that these are living documents, these -- the site profile is, but how -- how do we come to close on it when -- I'm trying to figure out -- you know, I guess I'm looking

back at SC&A and saying has this been done to your satisfaction, because I'm along with Ms. Munn, I cannot do all these calculations. But I want to make sure that we are doing the best job that we can and that I -- I'm getting -- that we're getting everything as clear as possible, that the -- the concerns that were addressed have been taken care of and that they were implemented properly. I guess that's where my -- I'm -- I'm coming to complete close. I guess -- I guess that's where I come to -- when are they really closed.

DR. WADE: Brad, this is Lew again. And again, some of this is semantics, but some of it isn't. The moment of complete closure will be judged by the working group, and the working group has to decide if it needs assistance in coming to that. SC&A's judgment as to whether the work has been done to their satisfaction is really not a key judgment. They answer the questions that the Board raises. They make comments and critiques on documents, and then it finally rests with the workgroup. Now the workgroup members should feel comfortable in voicing their view that they need their

contractor to view a certain issue or to go into more depth. That's perfectly reasonable. And if the working group decides it's fine, that's fine. But eventually it comes to the working group to say we're satisfied with this, using your contractor as you need to to make that judgment.

MR. PRESLEY: This is Bob Presley. One thing I want to -- I want to say again, and Brad said it, Wanda said it, this is a living document. This thing -- I hate to say it, but fortunately or unfortunately, none of these things will ever be closed. And if something else comes up in them, they're going to be re-opened, they're going to be re-looked at. What we have to do is decide if what we know today has been completed to the best of -- of NIOSH's ability with the -- I guess with the okay of SC&A. And I realize that each time -- SC&A doesn't always see exactly the same eye as -- as NIOSH sees, but -- and the reason for that is a lot of times there's more than one way to do this. And we have discussed these items and discussed them and discussed them and discussed them, and when we have written down here that this is

complete and this item is closed, at that point, that -- to me, that item is closed. And you know, if something happens down the road and we need to add another radionuclide, that's possible. It's not closed.

MR. CLAWSON: Well, and -- and Bob, this is Brad, and I understand that. But part of my problem that I have is the TBD is a living document, but an SEC petition is not. Once we say that it's not an SEC petition, it's not. And it's -- it's -- it's not a living document, and that's -- that's why -- and -- and all of us being from different areas into this, we all want to make sure that these are being done right and -- and I know as a -- as a Advisory Board we don't see eye to eye and I understand that, and I know that SC&A and NIOSH will never really see eye to eye on -- on some things, either. That's just the nature of the game. But -- but I sure re-- you know, as the TBD goes, I realize it's a living document, but we have certain parts out there that are not living documents and we need to make sure that we have covered everything we can to make sure that we're addressing -- especially the SEC

petitions -- to full potential.

MR. PRESLEY: Okay. Well, that -- that's great. But now this is not an SEC petition. This is a site profile document.

MR. CLAWSON: Right, and I realize that. But -- but that's what we base a lot of our SEC petitions on.

MR. PRESLEY: That's correct.

MR. CLAWSON: These TBDs.

MS. MUNN: But if there's additional information that can be presented, the SEC presents it, and that can very easily trigger another look at the TBD.

MR. PRESLEY: Correct. That's right.

MR. SCHOFIELD: This is Phil. There's -- there's one other thing here. Some of the more obscure isotopes that -- they may appear or disappear off of this list -- really the one -- one down to is how -- what ones were the people monitored for? What ones do they actually have data saying we can safely say the people are -- you know, are exposed to this one or this particular isotope is covered by our analysis on another type of isotope or something, you know. What were the people actually monitored

for?

MR. ROLFES: Is that a question for me, Phil?

MR. SCHOFIELD: Yeah, I mean, you know, some of them may not really need to be on the list. Some of them may -- may need to be there because they weren't monitored for those, and that's something I think that needs to be worked out between NIOSH and SC&A.

MR. ROLFES: Okay. Well, what I can do is explain a little bit on -- for example, if you take a look at the list -- do you have the list in front of you or...

MR. SCHOFIELD: No, I -- pull it up there.

MR. ROLFES: Okay. Okay, for example, people were monitored based on the potential for exposure to a particular set of radionuclides, and that set was based on planning done for each individual shot, as well as air monitoring data associated with those shots. Based on the air monitoring results, if an air monitoring result came back high for a particular radionuclide or a set of radionuclides, the individuals would be assigned to a bioassay program based upon what they were potentially exposed to.

For example, if they were potentially exposed to fission products, the individual would have been requested -- would have had a bioassay sample requested of them for fission products. If that fission product -- fission product result came back non-positive, or negative if you would like to refer to it, then nothing further was done at that time, in the early days. If it did come back positive, more specific analyses and follow-up urinalyses were conducted. So each -- for each test, based on the data associated with that test, there were requests for urine samples following an unusual occurrence or a high air monitoring result associated with that test. And that was based on each -- the specifics of each test.

MR. SCHOFIELD: Now would this information be made to the claimants, too, so that they know what ones they were monitored for?

MR. ROLFES: Well, the information would be contained within their DOE dosimetry response files, which are available to claimants under the Freedom of Information Act.

MR. SCHOFIELD: So you're saying they would actually have to file FOIA?

MR. ROLFES: Correct.
MR. ELLIOTT: Phil, this is Larry Elliott. Yes, if a claimant wants a copy of their entire file that has been developed while we've had it in our hands and been working it up, and that file would include the DOE dose information that we had requested and received, then we would ask them to provide a FOIA request to us to get that -- reason being that there are a large number of documents contained in these -- in these claim files and some of the documents, especially those that we get from the Department of Energy, have a lot of other individual workers' information in the document that's sent to us for that particular claim.
MR. SCHOFIELD: Uh-huh. Is there any way that in their file they could at least be notified these were the -- whatever element or isotopes you were monitored for, so at least that information is there, not necessarily tied to a particular shot, but they know that they were actually monitored for these things?
MS. MUNN: This is Wanda. Phil, can I -- can I make a stab at trying to -- trying to make a little sense out of what we're struggling with

here? You understand that what is really important is the dose the individual received. The dose will tell you what the biological effect is, regardless of what the isotope was, or group of isotopes were. What happens to you is what's important. What -- what gets to you is what's important. And if you have bioassay data, then you know that.

MR. SCHOFIELD: Right, but some of these are fairly short-lived isotopes that could have a fairly significant dose tied to them that maybe they needed to be monitored for, maybe they didn't need to be monitored for them.

MR. ROLFES: Phil, this is Mark again.

MR. SCHOFIELD: Yeah.

MR. ROLFES: One of -- for example, if an individual was exposed to short-lived fission products, the most likely -- you know, at NTS external doses were the controlling factor rather than internal doses, and there are studies to support that. The -- if an individual was exposed to fission products, the dosimetric concern would be an external dose that the individual received. And I believe nearly 100 percent of the individuals that

entered the Nevada Test Site after the year of 1957 were in fact monitored by a dosi-- using a film badge or dosimeter. So many of these radionuclides, rather than being of concern for internal dosimetry, are primarily an external dosimetry concern.

MR. SCHOFIELD: Okay. Well, see, that answers my question there.

MR. ROLFES: Okay.

MR. SCHOFIELD: So that obviously eases my concern on some of this other stuff.

MR. ROLFES: Okay.

MS. MUNN: Now we're back to the basic question.

MR. PRESLEY: Right.

MS. MUNN: Is this or is this not a closed matter? Do we or do we not require SC&A to go back and do further calculations to identify that, in their mind, they are content with the list of nuclides that's presented to them as being those of adequate dose concern?

DR. WADE: And this is Lew. I could do a little bit of process talk, if you'd like me to. We have no rigorous mechanism for decision-making within a workgroup. The

workgroup really isn't so much a decision-making body as it is a place where exploratory work is done and issues are explored.

In a case like this the workgroup could decide that it will make a decision on an issue like this either by consensus, requiring everyone to support going back to SC&A. They could say -- could make it based upon a majority opinion of the workgroup. Or they could say if one workgroup member wants this inquiry to continue, that it would continue that way. You could stop now and decide how you'd like to make a decision generically, and then make it on this case. (Unintelligible) could consider to talk about this case and try and reach some consensus among you. That's really up to you. You could also delegate the responsibility to the chair. I mean there are various ways to make decisions. You know, we've not come to this point before where a workgroup had to hammer out its decision-making process. Maybe we're approaching that now, maybe we're not. But I leave that for your consideration, but those are options available to you.

MR. CLAWSON: Well, and Lew, this is Brad. I

don't mean to butt in there, Bob, but I -- I guess I'm looking on down the road because I -- I've seen -- as long as we realize that if this ends up in an SEC or whatever like that, that we may have to end up reviewing this. But maybe for this -- at this point, it -- it doesn't require that much digging back into. You know, they've addressed these radionuclides that SC&A brought up. I'm -- I'm just -- it seems like we -- what I've been seeing on these workgroups is we close it in this and then all of a sudden when we go into an SEC it gets opened back up and things change so much. And I realize these are living documents. I just -- I guess I'm trying to look a little bit further down the road than maybe what I need to. So Bob, I'll turn it back over to you.

MR. PRESLEY: Okay. What I would really like to do on this is to be able for us to come to a consensus of yes, is this thing closed; or no, then we need to ask the contractor or we need to ask NIOSH to take a better look at this. In my estimation, you know, this thing is -- we have beat it to death. We've done what we were asked to do. And do y'all want to -- to have

this thing as a consensus or if one person or two people don't think it's closed, then you know, we can say that when we make our recommendation to the Board.

DR. ROESSLER: Bob, this is Gen. I would like to see some sort of consensus within the workgroup because if we don't have it, it seems like it's something that's going to pop up again. When things pop up again, then we have delays that were not fair to the claimants and to the groups involved here. I -- I'm wondering just how much time it would take for Arjun or SC&A to look at this particular issue, the -- the radionuclides. It seems -- you know, Arjun's very knowledgeable about these radionuclides. He knows what the contribution would be to dose, and it seems to me it wouldn't take much time. I'd -- I'd really like to have it resolved before we go to Las Vegas.

MS. MUNN: I'd like to have it resolved before Las Vegas, too. I just feel that we have looked at it and talked about it before, and although there have not been -- as -- as Arjun indicates, we haven't had them specifically do

calculations to indicate that there isn't anything else on the NAS report that they feel is of major consequence with respect to -- or reasonable consequence of -- of dose concern, that -- I have no feel for how many items there are on that list, and I -- I have -- we talked about the REECo data many times. And it has seemed acceptable in the past. I'd really like to see us get this over and done with, but I -- I'd really much prefer for us to be able to say yes, this is acceptable, go. To me, it's -- it can't help but be like an engineering question. You know, at some point you have to say this is the design to which we're going to build. If major information arises that causes us to believe we cannot build in this way, then we can revise it. But this is our design. And I -- I see what we -- the work that has been done here is expensive. For me, I'm willing to say this is the design. Let's go with this unless we have major reason to believe that this is improper -- that this is not the best science, 'cause that's what we're going for is the best science.

MR. PRESLEY: That's correct. Phillip, have

you got a comment on this?

MR. SCHOFIELD: I'm -- right now I don't really have a problem with the table as it -- as it stands. But then again, you know, there's a lot of these I'm not familiar with. I think as long as we hold that option that we can reopen it if for some reason there's things been left off the list, I feel comfortable at this point in going ahead and going with the list.

MR. PRESLEY: We can always reopen it. That's no problem.

MR. SCHOFIELD: Right.

MR. PRESLEY: That's -- you know, if somebody comes up with -- with a -- a new wrinkle on something, it can always be reopened. So at this point what I'd like to say is, you know, we will -- on each item we will pool the Board as -- not the Board but the working group as to what their wish is, whether we can say the item's closed or -- or then we leave it open and we're going to ask somebody to do some more work on it. At this time that's what I would like to do is the Board to -- to -- to have a consensus on these things. Anybody got any -- or not the Board but the working group.

Brad, have you got a problem with that?

MR. CLAWSON: No, I -- I don't, Bob. I just -- I -- here's my own frustration and I feel it from all the -- the working groups that -- you know, we come to a closure on this when we're doing the TBD, but as we get back into it, just so that we all realize that this will come up again and we may have to do a little bit further in-depth inspection into it. I guess I was just trying to -- trying to put the cart before the horse a little bit there. I don't have a problem with -- with what we have, just as long as we realize that it'll probably rear its head again in another setting.

MS. MUNN: There's always an easy in, Phil.

MR. PRESLEY: Yeah, and -- and you know, you -- you could -- could have that list come out at a -- you know, even on -- on another site profile -- okay? -- that would -- that would add something to it somewhere else down the road. But for the -- for the NTS one, I would like to say that we feel like that -- that we have done as much as we possibly can and we accept the comment as completed.

MS. MUNN: Resolved.

MR. PRESLEY: As resolved.

MR. CLAWSON: That'd be fine with me, Bob.

MR. PRESLEY: Okay.

MR. SCHOFIELD: I'll agree with that, too.

MR. PRESLEY: Okay.

DR. WADE: This is Lew. I'd like to make one general comment. The strength of this Board's process is -- and its workgroup processes, are the input the individual members bring to it, so these kinds of discussions and that broad process to discuss is very important and I thank Brad for raising the issue and I would thank the workgroup for its professionalism in resolving the issue.

MR. PRESLEY: Oh, yes. Okay, does -- does anybody have a -- a comment that -- that this should not be closed?

MS. MUNN: I think you've been -- that they've been polled.

MR. PRESLEY: Okay.

MS. MUNN: I think all of us have said consider it resolved.

MR. PRESLEY: All righty, I'm going to mark this one resolved. And I appreciate all the comments.

COMMENT TWO: LARGE HOT PARTICLES TO SKIN AND GI TRACT

We'll go on to number two, and it states that the TBD does not provide adequate guidance for dose estimations to the gonads, skin and gastrointestinal tract for the early reactor entry personnel. It has to do with large particles -- large hot particles to the skin and the GI tract. And this mentions then work that was done at the Naval Reactor as well. And Mark, do you want to --

MR. ROLFES: Yes, we --

MR. PRESLEY: -- care to comment on this, please?

MR. ROLFES: Yes, thank you, Bob. We did consider the Naval Radiological Defense Laboratory information that was documented, associated with some of the nuclear rocket development station tests. Information is contained within the site profile now based on the Naval Radiological Defense Laboratory document from 1968, and it is this information that will in fact allow us to bound potential doses to all of the organs listed.

This has been addressed in the Nevada Test Site

site profile chapter five Revision 1 at Section 5.6.5.3 and also in the Nevada Test Site chapter six Revision 1, page change one, Section 6.5.1 and 6.5.2.

MR. PRESLEY: Okay. Arjun, do you have a comment?

DR. MAKHIJANI: Yeah, we've -- we've given you our review of the -- of the external dose sections before, as requested, but we have not done any review of the internal dose revision -- this NTS volume five Revision 1. We have not been asked to review that.

MR. PRESLEY: Okay.

DR. MAURO: This is John Mauro. I do -- there was one matter in your response -- in your matrix that I did want to raise that needed clarification. I fully agree that using a VAR-- VARSKIN -- you know, you have the wherewithal to derive doses -- localized doses from hot particles --

MR. ROLFES: Uh-huh.

DR. MAURO: -- that might land on -- so I -- I -- so I -- I agree with that. The question that I have is when are you going to -- on the one -- it's not really clear, and we've had

this discussion I believe related to one of our procedure reviews -- that is -- that if -- if you have an individual and he comes down with skin cancer and -- and -- there wa-- he was operating in a setting with potential for particles, for hot particles --

MR. ROLFES: Uh-huh.

DR. MAURO: -- could have been created and landed on his skin, the -- my understanding, and correct me if I'm wrong, is that whether or not you attribute that exposure scenario to that person is going to be based on his records of whether or not, you know, he -- he was found to have any contamination upon leaving a controlled area --

MR. ROLFES: Uh-huh.

DR. MAURO: -- and that he required decontamination, and that usually comes out of -- of the CATI interview. And I think that whether you trigger using VARSKIN or not (break in transmission) on whether or not you believe that scenario applies to that person, and that determination is based on the CATI. My question that I raise is really not a -- it was a concern and a question -- is that if there

was a high level of assurance that those individuals that were involved in such exposure scenarios can be identified by the CATI interview, I would say great, then you know -- then you could triage, you can say who we're going to do this for and who we're not. But my concern was that -- that -- two things. One, it may not be -- that kind of information may not be in the CATI. In addition, even if there's no records that -- let's say a person was leaving an area and they did not detect any hot particles, and my question was -- and I don't have the answer to this -- is is it -- is there -- is there a high level of assurance that if a person did have a -- was contaminated locally that the exit survey would capture that so that he could be decontaminated, or is this a circumstance where it's -- you know, there's a fairly good chance a person could have a hot particle and leave with it on him and maybe not -- really won't be removed until he takes a shower at home. So it wasn't the method -- I agree that VARSKIN is the tool and it will allow you to do this. It's whether or not -- how you're going to ap-- when you're going --

how you're going to go about choosing who you're going to apply that to.

MR. ROLFES: Yeah, there -- there's a --

DR. MAKHIJANI: Just so I can supplement that, Mark, a little bit, as I was saying, SC&A did submit on October 10th a response to Revision 1 of external dose section, Nevada Test Site Technical Basis Document. And in that we addressed -- we reviewed the revisions that Mark has mentioned in -- in this matrix for volume six, for chapter six of the site profile only, and our comment was exactly that of John. We didn't have a comment with the technical approach, but we did say that issues remain outstanding as NIOSH has provided no substantial evidence that hot particle data actually exists. Rather NIOSH has argued that it would normally not exist, so that's just a quotation from the document that we gave you. So we've reviewed NIOSH's response and -- and not had a technical problem with it. We were in agreement with a portion of it, but -- but not in agree-- you know, not -- not in agreement with the idea that -- that data exists to know when this -- when the exposures

happened.

DR. MAURO: I think we're halfway home. They -- that's the good news. The good news is -- it's really one now of, you know, do you have a robust method where there's a high level of confidence that you -- you will pick the -- you'll know when to apply these -- these techniques, to which claims.

MR. ROLFES: Yes, we have a high degree of confidence in the areas of concern where hot particle exposures could have been encountered. The individuals -- and this is pertinent to the Nuclear Reactor Development Station or Nuclear Rocket Development Station --

DR. MAURO: Yes.

MR. ROLFES: -- and the individuals that would have been involved in re-entry were those who would have been potentially exposed to hot particles. These re-entry teams were documented and these are typically made up of -- of radiation monitors and other project engineers and scientists.

DR. MAURO: Oh, okay, that -- that --

MR. ROLFES: The individuals also would have been dressed in double anti-contamination

suits, had shoe covers on, gloves, respirators. The individuals following potential exposures would have been surveyed and dressed out to ensure that there was no contamination. And if a contamination was in fact found, as has been documented in some of the reports, the individual was appropriately decontaminated or de-- you know, if an individual -- there is documentation of some shoe contamination, as well, and the individual's shoes, it does say, were decontaminated or disposed of. So --

MR. CLAWSON: Mark, this is Brad. I understand, you know, about the re-entry teams and everything else like that, but what I was somewhat a little bit nervous about was -- and we even have members on the Board that were involved in some of these -- was the outlining (sic) areas of some of these tests. I've heard a couple of comment about working -- they weren't working in the propulsion system, but they were a ways away from that and they couldn't leave their trailers and stuff like that until they'd been hosed down and so forth like that because of the -- the spread of this. And this -- this was my one area of worry is --

I wasn't worried so much about the re-entry teams, but the surrounding areas that were subjected to some of this fallout.

MR. ROLFES: Okay, do you know a specific test or a specific time period? There were obviously -- what we're referring to in this discussion is hot particles. There were some occasions where, for example, fission product gases such as radioiodines were released into the atmosphere in --

MR. CLAWSON: This was -- this was actually with Pluto and when -- when they fired it off and there was some of the outlining (sic) areas, if I'm -- recollection's right, some of the tests that was being done elsewhere, they weren't even at a test -- they weren't even a part of this rocket propulsion system, but that they were -- before they could fire that off, everybody had to go inside and -- before they could come back out and part of the thing was is -- you know, you wash those hot particles off the tops of trailers and stuff and when it dries out, where did they go and so forth like that. That was -- that was just one of my things that I was a little bit nervous about.

I understand about the re-entry teams.

MR. ROLFES: Okay, that's -- for example, with the Pluto reactor, I know we do have some people on the phone that were involved in that as well. The -- I -- I don't off the top of my head have the information if there were in fact potential hot particle exposures. But once again, there may have been fission product exposure potential from that reactor.

MR. CLAWSON: Maybe that's more what I'm (unintelligible) at because they were -- they were talking about that the -- before that they could even come out of these trailers, which had air -- air being pulled into them, which they found kind of a little bit interesting, but that they all had to be washed down and stuff like that because of -- and I guess possibly that's what it is, part of the fission product.

MR. ROLFES: Bob, do we -- do we have any ORAU people on the line that might be able to comment on this?

DR. MAURO: That would be -- be -- Mark, I do -- I do want to hear they -- that response, but I'd like to also set another perspective that I

think is -- as we go through this process. This is a very important discussion now, and I'll tell you why I believe that. In effect, what I'm hearing is that the sce-- the scenario where a person might leave a site and have some particulate -- a part-- hot particle contamination on his hands, face or any pos-- possibly other parts of his body, on his clothing, is really not a scenario that could occur. I mean in effect -- tell me if I'm interpreting what I heard you say correctly. That scenario can't really occur because -- so that anyone that let's say comes down with a skin cancer and has a claim for that --

MR. ROLFES: Uh-huh.

DR. MAURO: -- what I'm hearing is that on-- it is not possible that that skin cancer was caused by a hot particle because you know -- because the controls were in place to avoid having a person having a hot particle deposited on him and him leaving the site with that hot particle, it's -- because I think that's what effectively you're saying. And it really does away with the possibility that that scenario is really one that could have resulted in a skin

cancer. I -- I know I just drew a very broad-brush conclusion, but that's what I heard.

MR. ROLFES: Well, true. In addition, if an individual is diagnosed with a skin cancer, in order for the hot particle to be of dosimetric importance to that individual, that hot particle would have had to have been deposited in the exact location that the individual's skin cancer was diagnosed.

DR. MAURO: That's correct.

DR. MAKHIJANI: Now what happens when you don't know where the hot particle was lodged?

DR. MAURO: But Arjun, what I'm hearing is that can't happen.

DR. MAKHIJANI: Oh.

DR. MAURO: You see, the position is that sites where there were hot particles, such as these rocket test sites and other sites, are known and were known at the time that they had a hot particle potential. And as a result, the access and egress controls was such as to preclude the possibility that a person would receive direct contamination on his skin from the hot particle, and -- and after -- after going through -- exiting the site, there was a

the -- the decon process that would confirm that he's not walking off-site with any -- any -- any screamers, let's say, on his skin or something -- some strong beta emitter on his skin. And if that's the case and that's the -- and -- and you feel confident with that, that -- that's fine. But I think it's important that -- what I heard is that that scenario really can't happen and so therefore we're not going to have a circumstance where a person later on with a skin cancer could claim that well, the skin cancer was because of a hot particle. That's really off the table now.

MR. ROLFES: The probability of an undocumented exposure is so minuscule in such a scenario for an individual that was not directly involved with the test. I have documentation in front of me regarding ground particulate contamination and the number of particles produced per 100 square feet in relation to test cell A at the Test Site, and I believe this was area 25. There's survey information with radiation levels and the number of particles within a given area surrounding the test cell. And -- let's see -- the highest

documented number that I have in the closest position to the test cell for this particular test was 22 particles per 100 square feet. As the distance increases, it quickly drops off. That was the single highest value. The great majority of these values that are documented here are less than one particle per 100 square feet.

So because of the access controls surrounding these tests, it's very unlikely that an individual would have been exposed to a hot particle or been in an area when a test was conducted, or following the test, other than individuals that were directly associated with radiation monitoring.

DR. MAURO: You know, if in fact the case is made that that scenario where a person's skin cancer really could not have been due to an undetected hot particle, and you have -- you know, what I'm hearing is you have a -- a lots of analysis and evidence that that in fact is the case, that's an important conclusion 'cause it really goes toward, interestingly enough, the resolution of a concern we have on OTIB-17 and -- and I think that -- this -- this

decision, this judgment that -- that we're making here has far-reaching implications and is very important. And I'm not saying that's not the right judgment, but I -- I would I guess alert everybody on the phone that I see it as a very important deci-- judgment and that will have far-reaching implications across the complex.

MR. PRESLEY: This is Bob Presley. I don't really know what to say except we have -- or NIOSH has gone back and looked at all the data and have probably hundreds of thousands of samples where they did actually go in and check the people as they egressed the areas after this. Is this not correct, Mark?

MR. ROLFES: Yes, that's correct. The individuals that were involved in re-entry were in fact monitored and frisked on the exit of the area.

MR. PRESLEY: Okay. Then do -- how many people -- do we know that if -- say how many of these people have filed for compensation or if -- or -- or not? I don't know whether that would have any bearing on this or not, but I -- I think we could say that with -- you never can

say without a shadow of a doubt, but you know, within the best scientific field, we can say that all was done to make sure that these people didn't have hot particles and that if there was, somebody picked up one down the road, you know, we should know about it.

MR. ROLFES: The likelihood of someone picking one up down the road is very, very unlikely --

MR. PRESLEY: That's correct.

MR. ROLFES: -- and then there's just no -- no credible exposure scenario that I could think of where this could have occurred, just because of the very low number of hot particles downwind of the test area, very low number of people that would have been downwind of the test, and the very -- because -- because these particles are very radioactive, that means that they decay very, very quickly. And so if you're not in the area within that day or two following that test, those particles were not going to exist any longer. They decay very quickly and that's why they are so radioactive.

MR. PRESLEY: Okay.

DR. MAKHIJANI: Mark, this is Arjun. Are we taking the tunnel re-- comments two and three

and tunnel re-entry and atmospheric and reactor workers all in the same comment, or are we separating them? I just -- just so I'm not commenting on something we're not -- that's not on the table.

MR. ROLFES: Let's see here, what I've been speaking to right now was related to the RDS --

DR. MAKHIJANI: Yeah, right, I thought so.

MR. ROLFES: -- and that was comment two.

DR. MAKHIJANI: Right, okay. But the same -- same comments apply -- you know, your same responses -- I thought you gave a common response to points two and three, comments two and three.

MR. ROLFES: Oh, okay, let me --

DR. MAKHIJANI: I just wondered whether the position -- I just wondered whether the position was that tunnel -- early tunnel re-entry workers could not have had any hot particle or that they were always monitored on -- on -- on exit.

MR. ROLFES: Let me see here, I'm taking a look. Well, the -- the Nuclear Rocket Development Station parameters would not be applicable to dose estimates for workers

associated with drill-backs -- well, if we'd like to get into that, we can go ahead and proceed with number three, if that's what you're asking, Arjun.

DR. MAKHIJANI: No, I was just asking whether all the comments were -- to two and three and you said they were in relation to two, so I'm happy to hold.

MR. ROLFES: Well, that's what I'm saying, we can move on to comment three if you'd like, if that's what --

DR. MAKHIJANI: Well, what-- what--

MR. ROLFES: -- I was speaking to comment two.

DR. MAKHIJANI: -- whatever Mr. Presley --

DR. MAURO: Am I correct that really the arguments are about the same, though. You have VARSKIN available to you if it's -- and if it turns out in case that you -- you believe that there might be a problem here, but the likelihood that such a scenario actually occurred and had gone on undetected at the time is virtual -- a -- virtually zero -- (unintelligible) it's extremely small. And I think it's important, whether we're talking about the ro-- the engine -- rocket engine test

or we're talking about underground tests at Nevada Test Site or at other sites. You know, the basic I guess view of this as being an issue is -- is being addressed right now in this setting. I think it's important. And I'm not saying that you -- you don't have your ar-- your case right. I mean it may turn out that this concern that's in OTIB-7-- that we raise regarding OTIB-17 is in fact really a non-issue because of the controls that are in place and the probability that -- I think your argument also is the probability that just so happens if the particle, you know, is responsible for that, it landed undetected, was there long enough and delivered a high enough dose that it would in fact be the cause of a skin cancer. So I -- I -- I know we're trying to focus in and resolve the issue here as it applies even to the tunnel workers in -- in number three or in the rocket engine tests in number two, but the judgment's got to be made right now -- I'll say it again, are -- will have applicability to OTIB-17 and to many other places where we're addressing hot particle issues, which includes Hanford and other -- other sites.

DR. ANSPAUGH: Well, this -- this is Lynn Anspaugh and I'd like to just comment that I think you're being a little optimistic. These -- the project (unintelligible) for example went on for 11 years and it's not clear that they had this (break in transmission) model-- monitoring in place in the early days, but there was one test that released 250,000 curies, some of which was easily detected off-site, so I -- I think there may not be a generic statement that you can just neglect this.

MR. ROLFES: Well, Lynn -- this is Mark Rolfes -- and what we are speaking specifically to are hot particle exposures. We do acknowledge that radioiodine, other radioactive noble gases, were released, other radioactive halites were released. That -- that is not contested at all. We certainly acknowledge that and we do assign doses from potential exposures to personnel. What we are speaking specifically to is production of hot particles and potential undocumented exposures to individuals.

DR. ANSPAUGH: That's what I am speaking to, too, and when you're in Las Vegas I'd like to

show you a movie of how one of these reactors blew up.

MR. ROLFES: Yes, the Kiwi TNT test. Is that the one you are referring to?

DR. ANSPAUGH: I'm -- I'm not sure. I don't recall all of them by name. I --

MR. ROLFES: Well, yeah, I certainly would be interested in seeing that, Lynn.

DR. ANSPAUGH: Okay.

MR. CHEW: Mark? Hi, this is Mel.

MR. ROLFES: Yes.

MR. CHEW: I just want to address Brad Clawson's comment. Brad, you were correct. There are two maj-- there were two major programs at the Nevada Test Site for the rocket development. One was Project Rover and what Lynn just talked about, and the other one was Project Tory* -- the -- Pluto, and the first reactor that the -- after Pluto was the Tory reactor and I happened to be, just by -- dates me right now -- was on the initial re-entry team to look at the nozzle of the reactor and the reactor stayed very much intact, and so what he was talking about was probably the mixed fission product from the Tory 1-A and the

Tory 2-A reactor experiments here. What Lynn is talking about is the Project Rover, which is the Kiwi reactors and Los Alamos experiments here, and they were separated from the sites by a few miles here. Just want to set the record that there was two programs here, Pluto and Rover.

MR. ROLFES: Yes, and Mel, this -- I would like to add also that we do have documentation of the environmental effects of the Kiwi TNT effluent, and this is a Los Alamos Scientific Laboratory document -- I'm trying to find the date -- but this reviews and evaluates the information regarding the test. The report is dated January 1968 and was distributed in April 1968. There is information on radiation surveys, et cetera, following the test and -- let's see, this is a 68-page report that we have, Los Alamos 3449.

MR. CLAWSON: Hey, Mark, this -- this is Brad, and I don't want to show my ignorance or anything else like that, but when we're talking about hot particles, this is -- this is still part of the fission products or -- or am I wrong in that?

MR. ROLFES: No, that's correct, these are short-lived fission products that are responsible -- fission and activation products that would be responsible for -- yes, it's -- it's short-lived fission products and activation products.

MR. CLAWSON: Well, and -- and I appreciate Mel chiming in on that because if -- if you remember right when we were in Nevada last time down there, we had some of the petitioners talking about these propulsion systems --

MR. ROLFES: Uh-huh.

MR. CLAWSON: -- and they weren't part of the re-entry team. And this is -- this is where some of this is coming from, but they were I guess -- be able to use the term downwinders or -- or whatever that -- like that that we're getting from this product, and that was my only concern, that -- I know that the re-entry teams were watched very well, but I was worried about the outside areas and so forth like that.

MR. ROLFES: Sure, okay. All right. For the people in the outside areas, the -- excuse me, the hot particle exposure potential is -- is very, very low. That -- however, the people

that are farther away could potentially be exposed to gaseous, volatile radionuclide releases such as radioiodine exposures, radio-- let's see, I believe krypton -- and there are some other radionuclides that were associated with some of those tests. As we understand -- we did speak with a health physicist that was directly involved with some of these tests, and there were mechanisms that were used -- I believe they were called "frogs" -- and they were essentially containment caps to prevent -- following the reactor test to prevent the continuous venting of fission products or gaseous fission products from the reactors. If we have Billy on the line, did -- did I get that correct? They were "frogs" I believe?

MR. SMITH: Yes, that was the description that Bruce gave us.

MR. ROLFES: Yes.

MR. SMITH: I was not involved in those tests personally at that time because that was before my time, but --

MR. ROLFES: Okay.

MR. SMITH: -- but that is what the person who was in charge of the health physics program at

NRDS at that time, that also operated the whole-body counter --

MR. ROLFES: Yeah.

MR. SMITH: -- indicated.

DR. ANSPAUGH: And who is Bruce, Billy?

MR. SMITH: Who is who?

DR. ANSPAUGH: Who is Bruce? You mentioned Bruce; is that correct?

MR. SMITH: No, I didn't mention Bruce, but --

DR. ANSPAUGH: Sorry.

MR. SMITH: -- we -- we -- we did interview a person who was in charge of the health physics program during the time that some of the nuclear rocket development tests were going on at NRDS and he was indicating the degree of -- of hot particle contamination, both on the ground and on the fallout trays and the -- the control programs that were involved in people that made re-entries and that were up-wind of the testing activities when they took place. No persons, as I understand it, in the controlled areas -- which was -- the NRDS was the controlled area -- were downwind of a test as it took place, regardless of the outcome of the test, other than people that may have been

off-site. That -- that interview I believe is on the O drive. Is that right, Mark?

MR. ROLFES: That's correct, and it has been provided to the Advisory Board members as well, so...

MR. PRESLEY: Mark, this is Bob.

MR. ROLFES: Yes.

MR. PRESLEY: Also, the Test Site had a large number of personnel that just as soon as something was over always went out and checked the area, even on-site and off-site. That was one of the reasons that they did plume studies, so that they would know where to go back and check after a -- after a release or a shot.

MR. ROLFES: Correct, there was monitoring done both on-site and off-site. The -- the United States Public Health Service was in charge of off-site monitoring and did in fact track any potential releases or effluents from the site as well, so...

MR. PRESLEY: That's correct. Is everybody --

MR. SCHOFIELD: Just one quick question -- this is Phil. That -- the monitoring was really the same for both the NRDS and the Project Rover?

MR. ROLFES: They -- the Nuclear Rocket

Development Station, I believe the Rover tests were conducted within area -- in the same area.

MR. SCHOFIELD: Okay, but the same rules and safeguards were handled in both the two different projects the same. Is --

MR. ROLFES: Yes.

MR. SCHOFIELD: -- this what I understand to be correct?

MR. ROLFES: Yes.

MR. SCHOFIELD: Okay.

MR. ROLFES: Yes, that's affirmative.

MR. PRESLEY: Yeah.

DR. MAURO: Hey, Mark, this is John. I -- I -- I think that -- what I -- what I'm hearing is that on -- on I guess a case-by-- not a case but a site-by-site or operation-by-operation basis, in effect you're in a position to make a statement that says well, at least in these circumstances there's plenty of evidence that we -- you know, there was controls in place for access and egress and for -- for where people were down-- whether they were up- or downwind so that you -- you had the controls in place so that really the -- the people in the vicinity of the -- the activity, the operation or the

test, were -- were adequately protected from hot particle exposures and also, because of the -- these -- it sounds like that there were sticky-tape -- I forget what you -- those plates --

MR. ROLFES: Fallout trays.

DR. MAURO: -- fallout trays --

MR. ROLFES: Uh-huh.

DR. MAURO: -- that you have pretty good data that says on the number per meter squared or per hundred square -- square meter of these particles that may have deposited as a function of distance, so in this circumstance you could really rule out that anyone could realistically have experienced a hot particle exposure on -- on skin that could have resulted in a skin cancer. Perhaps that line of argument with its associated documentation will need to be made every time we have a site or operation where hot particles are of concern, and so -- and -- and that's what I'm hearing, that the argument is here. That is, you have the evidence, the records, that show that there was controls in place that would effectively eliminate this as a plausible scenario for both workers who were

on-site and perhaps people who may have been off-site somewhere downwind.

MR. PRESLEY: That -- this is Bob Presley. That's what I see.

DR. MAURO: Okay. Well, if that's the case and the case is made, and your -- your review of this work, at least in the case of Nevada Test Site and -- and the rocket program and tunnel re-entry, I -- I think after -- that -- if that's the strategy that you've adopted -- now Arjun, to what extent did we -- have we looked at that information? That is the records regarding access and egress controls and this deposition of hot particles as a function of distance from these different operations. Have we looked at any of that?

DR. MAKHIJANI: No, John, this is -- this is new information. You know, we've reviewed new external dose site profile and made this comment and -- and NIOSH's response a few days later was to provide this information but we've not gone back and looked at it.

DR. MAURO: Okay. Well, I would -- I would say -- I mean this is SC&A speaking as that -- the concept, the strategy that is outlined as --

that -- described by Mark is conceptually powerful and valid. However, you know, the degree to which those controls were in fact in place and then -- and the data does in fact support that conclusion, we really haven't had an opportunity to review. And I also would like to say that if such a strategy is taken at other sites, it's -- go to -- this -- this is an important precedent is what I'm getting at, is that on a case-by-ca-- on a site-by-site basis if such controls and data are available that could put this issue to bed, this is the way it can be done. But it -- you know, and it sounds like we're pretty close to putting this issue to bed, at least at the Nevada Test Site. However, we -- we haven't looked (unintelligible) -- and what I would say is I think the strategy is valid and -- but we have not of course looked into the -- gone into the trenches and looked at the data itself.

MR. PRESLEY: Well --

MR. ROLFES: Now --

MR. PRESLEY: Go ahead.

MR. ROLFES: I -- I do want to caution everyone that if, for example, we would see an

individual telephone interview report from a claimant, if we had information that an individual was exposed to hot particles or a hot particle and had information within their claim file, then that would certainly be considered in their dose reconstruction. So just because the information -- because based on our review we haven't found any indication of, you know, a widespread issue, that does not mean that we're not going to still consider this in dose reconstruction.

DR. MAURO: Oh, okay, so -- then -- let's say we have a -- a claimant for skin cancer and in his CATI interview there is information that he had to be decontaminated, upon egress he was found to have contamination and went through decontamination. What would you do at that point in terms of specifically addressing dose reconstruction to that person? Would you assume that some hot particle did in fact deposited on the location where -- let's say it was on his face -- where the skin cancer was observed and do -- and assign to that -- that that dose to that location or would you somehow average it over his whole body?

MR. ROLFES: That would be a policy decision. However, the dose -- as you are aware, the dose to the skin -- we are calculating doses based upon the entire -- entire mass of the skin. That I know has been discussed previously and I think that Jim Neton would probably be best to answer that question as a policy decision, so...

DR. MAURO: Okay. I -- I mean what are -- did -- it sounds like then you do provide for doing that type of dose calculation. I just could -- not quite sure how you connect the -- a VARSKIN dose calculation to let's say a localized, one-centimeter square area of the skin to the dose to the -- to the skin that's used for the purpose of probability of causation, but maybe that's a -- that's a separate subject.

MR. ROLFES: One of -- one of the most important things, I'll reiterate, is that for an individual that would have a skin cancer on their face and had a hot particle exposure, we would have to first make sure that the individual's skin cancer and hot particle exposure occurred to the same area.

DR. MAURO: Okay, I understand. Okay.

MR. ROLFES: The individual's hot particle would have had to have been deposited on the same area that developed cancer in order for that to become a significant issue.

DR. MAURO: Okay, so you don't just automatically assume that yes, exposed to hot particle; yes, skin cancer; we're going to assume that hot particle landed right where the skin cancer originated.

MR. ROLFES: In a worst-case scenario, one could simply do that. However, based upon the facts of the case, if -- if that was the only information that we had indicating in -- in the file, for example, in the DOE dosimetry file, a blank statement saying a hot particle was deposited on this individual's skin and he was successfully decontaminated, say for example two hours after the exposure, we could do a worst-case scenario and assume that that hot particle was in fact deposited on the single location where the individual's skin cancer was diagnosed years later.

DR. MAURO: And -- and let's say you get a -- you got a probability of causation above .5, would you go back and redo it and do a --

something which takes into consideration the probability that that particle actually landed where it -- the worst possible place? In other words, I could see you using that approach as a maximizing approach for denial. Would you -- but if you wanted to -- if you found that you couldn't deny on that basis, would you -- are there other -- I guess I'm not familiar -- are there other procedures for how you would deal with that?

MR. ROLFES: One would have to take a look at the facts of the case and simply -- there's too many facts and too many different parameters that would need to be considered. First of all, you know, some of the most important pieces of information would likely be contained within the individual's dosimetry files, and that would be our first place where we would look in more detail. We would also take a look at some of the on-site rad safety reports and look at some of the areas that the individual was working in. There's just so many parameters that would be involved that we would have to take a look at and analyze in more detail.

DR. MAURO: I -- I thank you for indulging over this line of questions because this is something that has been on my mind for quite some time since we engaged OTIB-17, and I think this -- this discussion has gone a long way to resolving a lot of the concerns I had on that and -- not only on the issue we're talking about here, but also on OTIB-17.

MS. MUNN: Well, I'm certainly glad to hear that.

MR. PRESLEY: Yep.

MS. MUNN: There's one other thing before we leave this. Let's go back a little bit to some of the original comments, because --

MR. CLAWSON: Hey -- hey, Wanda, this is Brad. I -- I can't -- I can just barely hear you.

MS. MUNN: Oh, I'm just being too light-hearted, I guess. Let me see what I can do about speaking up here and -- here, I'll use the other phone. Just a moment.

(Pause)

Can you hear me better now?

MR. PRESLEY: That's better, Wanda.

MS. MUNN: Okay, very good.

MR. CLAWSON: Thank you.

MS. MUNN: I think what John said early on was very important with respect to making the case for adequate administrative oversight for many of these kinds of cases. It's been a long time since I read the entire document, and I do not recall -- Mark, can you tell us whether our -- our site description actually has any wording in it regarding the extent of monitoring and oversight that was given to these individual tests? Do we have adequate wording in there?

MR. ROLFES: Whether the site profile has wording on the oversight of each test?

MS. MUNN: Well, you recall as -- as John was saying, if the case has been made adequately that we do in fact have the kind of monitoring and the kind of individual oversight of each of these projects that we can say with a high degree of certainty that it's unlikely that hot particles would have been missed, then it's -- it's important for us to -- to see that that wording gets in the base document. I just don't know if it's there.

MR. ROLFES: I would have to go back and take a look. What I am referring to that I have been referencing are several on-site radiological

safety reports associated with each specific test. For example, I can just read a couple of the titles of them. One was the on-site rad safety report for the Nirva* test operations, NRX-A4. Another was Tory 2A operation, let's see -- see, additionally the environmental effects of the Kiwi TNT effluents.

MS. MUNN: And you feel there is wording in those specific documents that gives us the confidence that we need --

MR. ROLFES: Yes.

MS. MUNN: -- with respect to hot particles? Now -- and are they -- is that fact appropriately referenced in the site profile, and should it be? I guess that's the real question.

MR. ROLFES: I'm going to ask Gene Rollins to comment as to whether -- what level of detail we have put into our site profile documentation regarding the monitoring (unintelligible) --

MS. MUNN: I'd appreciate that because I simply don't remember.

MR. ROLFES: Okay. Gene, do you happen to have that language in front of you? I know you probably are most familiar with it as of late.

Do you have a feel for what level of detail we have put into the site profile regarding monitoring and potential exposures at the Nuclear Rocket Development Station at Nevada Test Site?

MR. ROLLINS: Mark, I -- I don't think we have put a lot of text into the document regarding this particular issue.

MS. MUNN: I wouldn't think it would need to be a lot of text. I just think we need to be very specific here essentially, since our technical contractor is saying to us you need to tell us if you've done that.

MR. ROLLINS: And -- and Wanda, what -- what you would like -- what you might expect to see would be a discussion as to the radiological controls that were used for these tests?

MS. MUNN: A paragraph indicating that the information that's necessary exists and citing the reference. That would appear to be adequate to me. Is that your view, John?

DR. MAURO: Yes, to me -- I think you're hot on the trail of resolving what I consider to be one of the lingering issues. And if in fact documentation exists that those types of access

and egress controls were in place at the time of these -- at least in these case, these experiments, or when it came to access and egress to the tunnels, then that type of documentation would go a long way to resolving this issue.

MS. MUNN: That's very important and it has ramifications on other sites.

MR. ROLLINS: And in addition to that, we also have documented an interview with the health physicist in charge with these controls about his direct experience. Maybe some of that would also be appropriate to put in there?

MR. ROLFES: I certainly think that would, if we haven't mentioned it. I know that we have detailed this within our Special Exposure Cohort evaluation report that --

MS. MUNN: Yes.

MR. ROLFES: -- has been released.

MS. MUNN: But people don't see all the documents.

MR. ROLFES: Sure, exactly. If it isn't in one document, it may be in another. But -- let's see --

MS. MUNN: If the site profile's going to be

our basic document, that's the best place for at least the indication that the information exists.

DR. MAURO: And I would take it a step further. When -- when you are concerned, as you had mentioned earlier that maybe there is a hot particle exposure that -- let's say in the person's records from a CATI interview or what-- whatever, and that you do -- if there's any -- right now I guess I haven't seen the guidance on okay, how do we do the dose -- you know, the dose reconstruction for this person when we are going to attribute to him some hot particle exposure. In this case I would assume that that would apply to either skin cancer or perhaps a breast cancer or -- or testic-- testicular cancer. You know, those cancers which theoretically could -- where the beta particles could find their way to the target organ. Is there -- I -- I have to say, it -- the -- the subject of using VARSKIN and the results of VARSKINs to what the dose would be likely, and then translating how you use that information in the dose reconstruction, I -- I'm not familiar with that. You may already

have something on that, but I -- I -- I haven't read it.

MR. ROLFES: Well, the likelihood that an individual would receive a significant dose from a hot particle deposited on their skin or on their anti-contamination clothing to any organ other than the skin is very, very unlikely and just another additional thing that would reduce the likelihood of such an exposure. Keep in mind that individuals that would have been potentially exposed to hot particles were dressed in anti-contamination -- double anti-contamination clothing, as well as respirators, gloves, protective clothing, and were monitored following re-entry.

DR. MAURO: Oh, no, no, and -- and I -- I agree -- that goes toward the access/egress controls that -- that the scenario can't happen.

MR. ROLFES: Yeah.

DR. MAURO: But I did hear you say, though, that under those occasions when there was a -- a -- a person was on a -- I guess on egress where it was determined that he -- there was a problem and he had to be decontaminated, that there are circumstances when you would run

VARSKIN. I get by your response also in wri-- in response to those two questions that VARSKIN is part of your suite of tools that will allow you to address these issues when they arise. So under those -- those circumstances where let's say it becomes a plausible scenario that a person might have received skin contamination and had to be decontaminated because of a hot particle, I -- what I understood was that you would use VARSKIN under those circumstances. And I guess my only concern is that -- and this may -- but this again is a more broadly applicable -- if I'm understanding this correctly, broadly applicable protocol that in fact you would do a dose reconstruction under those circumstances using VARSKIN and somehow use that information to determine a probability of causation, and I -- what I'm saying is given that you -- that is a possible scenario that you would address, I'm not familiar with any procedure or guidance on how you actually do that.

MR. ROLFES: Okay, sure. There's nothing that prevents a dose reconstruction from a hot particle being completed. Much of the

information is documented within the Naval Radiological Defense Laboratory documents, and the methodology essentially is there, information is there that would allow us to do a dose reconstruction for an individual. We would take that information and use information in VARSKIN in a hypothetical scenario when we have information indicating a potential hot particle exposure that is documented within the DOE response files.

DR. MAURO: There are no Procs or OTIBs, though, that talk about this. I know OTIB-17 doesn't.

MR. ROLFES: To my knowledge, I am not certain. I probably should not answer, you know, one way or the other as to whether there is a procedure on how to use VARSKIN that is within the NIOSH documentation -- technical documents.

MR. SCHOFIELD: Mark, this is Phil. I've got a quick question for you. You keep referring to the fact they were double coveralled. Do you know if they were wearing hoods and full face masks, or were they using half-face masks?

MR. ROLFES: I will ask if there's anyone on the telephone that could answer that specific

question. Is there anyone on the ORAU team that recalls whether these were full-face respirators or --

MR. CHEW: Mark, I -- I can help you on that. Now I was not involved with the Kiwi re-entries, but certainly the Tory re-entries was part of the Pluto project and I certainly was wearing a full-face mask with a canister, I remember that. The canister was marked pink, I remember that very carefully.

MS. MUNN: Funny how things --

MR. PRESLEY: This is Bob Presley. Everything that I've seen, they all have full-face masks and headgear on.

MR. ROLFES: Okay.

MR. PRESLEY: Okay?

MS. MUNN: So -- so, before we leave it entirely, again, are we going to request that a small amount of verbiage be added to our site profile that clarifies the issues we've just been discussing and gives them a reference?

MR. ROLFES: Well, before we commit to doing that, I would like to check to see whether that information may already be there. If there's someone on the ORAU team that is on the phone

call, if they could please take a look into our approved Technical Basis Documents and -- maybe they have already looked to see if that information is there and they could elaborate on it, if -- if they've already seen that information.

MS. MUNN: If it's there and we can identify it for location, that would be very helpful. If it's not there, it's almost crucial that we see that it gets there.

MR. ROLFES: Certainly.

MR. ROLLINS: I'll take a look at that while y'all carry on.

MR. ROLFES: Okay, great. Thank you, Gene.

MR. PRESLEY: All right --

DR. MAKHIJANI: One more thing in this regard -- this is Arjun. I think this takes care of the external dose piece, but when I commented at the start of this conversation on this point, I'd mentioned that there's an internal dose piece to this which you say is addressed in NTS five Rev. 01. We have not looked at that at all. In fact I actually don't have Rev. 01, I just have Rev. 00, PC-1, or something like that.

MR. ROLFES: Okay. Let's see, NTS six Rev. --
DR. MAKHIJANI: No, five.
MR. ROLFES: Okay, NTS five --
DR. MAKHIJANI: And (unintelligible) reference to the internal dose piece to that. This -- this -- this discussion takes care of the external dose piece, but at the bottom you say address in NTS-5 Rev. 01, Section 5.6.5.3. That piece we haven't reviewed. In fact, I -- I don't have that piece, Rev. 01 NTS-5. I only have NTS-5 Rev. 00 PC-1, which I presume is different. I -- I'm not sure.
MR. ROLFES: 001 and 01 are the same.
DR. MAKHIJANI: No, no, I have 00 PC-1, but I don't have --
MS. ARENT: This is -- this is Laurie Arent. I can answer that question. Following the -- the matrix, at the very bottom if you scan all the way down, it gives you a status of where the NTS TBD sections currently are. You are correct, you don't have Rev. 01 of NTS-5 yet. It is currently at OCAS for final approval.
DR. MAKHIJANI: Yes, so -- I mean the -- in the bottom of this -- not only have we not reviewed it, but we have not seen it.

MS. ARENT: You have not --
DR. MAKHIJANI: I just wanted to make that clear.
MS. ARENT: -- seen that, correct.
MR. ROLFES: Correct, that -- that's correct, I apologize for that, and thank you, Laurie.
MS. ARENT: You're welcome.
MR. ROLFES: Thank you. If everybody takes a look at the last page of the matrix, there's a small status table that we have put together and it documents the status of every Technical Basis Document section that is currently under revision or has been approved. And as Arjun's referencing, Nevada Test Site five, Rev. 00, Revision 01 is at OCAS for final approval.
MS. MUNN: It's been there for a while, hasn't it?
MR. PRESLEY: Okay, this is Bob Presley. I need to call about a five-minute break, and what I want to do is we will come back and talk about the response for -- Arjun, you want to talk about internal. Is that correct?
DR. MAKHIJANI: Yes, Mr. Presley. I mean if -- if we await both a document from NIOSH and your instruction, Mr. Presley, as to whether you

want us to look at that.

MR. PRESLEY: Okay. Can everybody take about a five-minute break, if you'll mute your phone and let's leave them open --

DR. ROESSLER: Bob?

MR. PRESLEY: Yes, ma'am.

DR. ROESSLER: What is your anticipation, and this is probably an impossible question to answer, as to how long the call will still proceed?

MR. PRESLEY: Well, it's supposed to go to 4:30. Is that not correct, Mark?

MR. ROLFES: I'm available as long as we need to get this finished, so I will make myself available as long as everyone is willing to make theirselves (sic) available.

MR. PRESLEY: I would -- I would love to finish this thing up, if we can, today before -- a little before 5:00, and I'll tell you why. I have a doctor's appointment at 6:00 p.m. today. And so I would like to go and let's finish this thing before 5:00, if possible.

DR. ROESSLER: Okay, that -- that helps, Bob. Thank you.

DR. BRANCHE: So Bob, you said a five-minute

break?

MR. PRESLEY: Yes. Everybody mute their phone, we'll go on a five-minute break and then I'll be right back.

(Whereupon, a recess was taken.)

DR. BRANCHE: Bob, have you already done a roll call or do you want me to do it again?

MR. PRESLEY: Christine, you want to go ahead and do that one more time?

DR. BRANCHE: Okay, I'll do it -- one sec.

(Pause)

All right, Mr. Presley?

MR. PRESLEY: Yes.

DR. BRANCHE: Brad Clawson?

MR. CLAWSON: Present.

DR. BRANCHE: Dr. Roessler?

DR. ROESSLER: Yes.

DR. BRANCHE: Mr. Schofield?

MR. SCHOFIELD: Yes.

DR. BRANCHE: Ms. Munn?

MS. MUNN: Yes.

DR. BRANCHE: Mr. Presley, you're free to continue.

MR. PRESLEY: We're all here. Thank you very much.

COMMENT THREE: INTERNAL DOSE

Now, we have gone through comments one and two, but Arjun had a comment for I believe it was three where he wanted to talk about external -- I mean, I'm sorry, internal dose.

DR. MAKHIJANI: Yeah, on two and three. It was just to say that we have not reviewed the internal dose because the document hasn't been published and we haven't been asked. So from our point of view -- you know, we read the NIOSH response, but have not done anything with it.

MR. PRESLEY: Okay. So really --

MR. ROLLINS: Bob, this is Gene Rollins.

MR. PRESLEY: Yeah.

MR. ROLLINS: I have reviewed chapter -- chapters five and six of the most current version of the NTS TBDs and there's currently no information in there about the radiological controls that were in place around the NRDS.

MR. PRESLEY: Okay.

MR. ROLLINS: So we can certainly put that in there.

MR. PRESLEY: Can we say that these two items are closed, except that we need verbiage placed

in there to take care of -- of rad con-- to address the rad controls, and also I want to note that we are waiting for the internal documents from NIOSH.

MR. ROLFES: That's correct, these -- and you're referring to the site profile document --

MR. PRESLEY: Uh-huh.

MR. ROLFES: -- Technical Basis Documents --

MR. PRESLEY: That's correct.

MR. ROLFES: -- that are in review.

MR. PRESLEY: So TBD, okay, and that is 00 -- is it 00 -- NTS-5, Revision 1 or 001?

MR. ROLFES: Let's see, it is NTS-5, Revision 00, Revision -- oh, okay, I'm sorry -- Revision 00 was the approved version. We are currently almost ready to approve the final version of Rev. 01 of NTS-5.

MR. PRESLEY: Okay, NTS-5. Okay, and we're awaiting that. All right.

Anybody have a problem with that?

MS. MUNN: Sounds good.

MR. PRESLEY: Okay. When can we expect the verbiage? Can -- can we have a rough draft of this verbiage before we go to Nevada?

MR. ROLFES: Mr. Presley, this is Mark. We have documented this in a formal communication with the health physicist associated with the Nuclear Rocket Development Station. I don't foresee any problems in referencing that report or that documentation of communication in the site profile, if that's necessary. However, I -- I did want to remind everyone that this documentation is included in the site research database and does serve as an official project document that can be referenced in a dose --

MR. PRESLEY: Okay, can --

MR. ROLFES: -- reconstruction.

MR. PRESLEY: -- can we put that in there, Mark, please?

MR. ROLFES: I cert-- I certainly can do so. We can certainly do that.

MR. PRESLEY: Wanda, is that all right with you?

MS. MUNN: That's fine, yeah.

MR. PRESLEY: Okay.

MS. MUNN: It's just that I think it's really important that we have the -- the words where they can be seen and referenced easily in the future because we will need them.

MR. PRESLEY: Okay. Let's go on to comment four. I think -- we have two and three on this matrix, but I think we've already taken care of those. Everybody agree?

DR. MAKHIJANI: We didn't address the tunnel workers, which we started to. Or is -- is that part of three? I don't remember. Let me just --

MR. ROLFES: Well, that was mentioned --

DR. MAKHIJANI: No, it is not. I'm sor-- or yes, it is part of three.

MR. ROLFES: Well, three was related to atmospheric -- SC&A's comment on number three was dose from large particles to GI tract and skin for workers in atmospheric testing has not been evaluated. Let's see, how do --

DR. MAKHIJANI: That -- that -- three also talks about drill-back.

MR. ROLFES: Yes, correct. And I -- I hadn't completed reading the comment here yet. It said hot particle doses also need to be evaluated for early drill-back and other re-entry workers during underground testing periods. And the -- excuse me, the NRDS parameters are not -- not applicable to the

underground testing period. It's a completely separate issue. But once again I'd like to reiterate that any documented hot particle exposures for individuals would be assigned in a dose reconstruction based on information documented by the DOE, such as a survey by an individual -- excuse me, a survey of an individual done by a radiation safety technician following exit of a re-entry team.

MR. PRESLEY: That would have to do with any re-entry team.

MR. ROLFES: Correct.

DR. MAKHIJANI: So Mark, is the position that you also have documentation about -- similar to the -- the reactor tests for tunnel re-entry workers?

MR. ROLFES: I do have documentation that there were survey procedures following re-entries that would have detected any potential skin contamination or potential exposures to radioactive material associated with that re-entry.

DR. MAKHIJANI: Okay. We -- we didn't see them and -- let me see, I'm just trying to see what we said in that regard. I guess -- I guess

that -- the position was the same, that -- that we had no problem with the procedure, but didn't see the documentation. So maybe you're going to add that, too.

MS. MUNN: It would be helpful.

MR. PRESLEY: Mark, yeah, go ahead and add that wording in there, too --

MR. ROLFES: Okay.

MR. PRESLEY: -- please, so we can cover everything.

MR. ROLFES: Before -- before we go on there, I would like to ask ORAU once again to make sure that we don't already have something in there so we don't get asked to do something that we've already done. If someone could take a look in the -- in the Technical Basis Documents to see if we have any information regarding exit surveys following tunnel re-entry.

MS. MUNN: Somehow I had thought we had something in there, but I don't know what it was.

MR. ROLLINS: This is Gene Rollins. I just went through these documents and I -- I don't believe that level of detail is currently in there.

MR. ROLFES: Okay. All right. Well, we can certainly add something into the site profile to provide a little bit more detail following a re-entry. I do have a couple of technical documents here in front of me that I can read into the record if you'd like, just the titles. The first is a Lawrence Radiation Laboratory general re-entry procedure for underground nuclear events, CN-294, and this is dated November 9th, 1961. I also do have a Reynolds and -- Electrical and Engineering Company CNA SNL re-entry document for day plus one activities, and that is also available on the site research database I believe at this time. So what we can do is incorporate some of the language from these documents and others into the site profile to provide a -- a descriptive -- some descriptive information regarding these radiological control practices.

MS. MUNN: Wonderful. Again, I don't think that description needs to be lengthy as long as -- as long as the resource reference is easily available.

MR. PRESLEY: Yes, and that's -- that's all I see, Mark.

MR. ROLFES: Okay. Okay. All right.

MR. PRESLEY: This is Bob Presley. I have no problems just --

MR. ROLFES: Okay, so we can put a couple of statements in there and reference these documents for --

MR. PRESLEY: That's fine.

MR. ROLFES: -- for -- okay, great.

MR. PRESLEY: Just do that. All right, is that all right with everybody, all the working group, please?

MS. MUNN: It is with me.

DR. ROESSLER: Okay.

MR. SCHOFIELD: Sounds good.

MR. PRESLEY: Okay.

MR. CLAWSON: (Unintelligible) with me.

COMMENT FOUR: INGESTION OF NON-RESPIRABLE HOT PARTICLES

MR. PRESLEY: All righty, thank you. Let's go on to comment four, ingestion of non-respirable hot particles by reactor testing and nuclear weapons testing workers needs to be evaluated. Mark, do you want to comment on this, please?

MR. ROLFES: Yes, hang on just one second. I am looking back at the -- let's see -- let's

see -- I was just looking back at our combined comments two and three, and I did want to note that we do have mention of dose reconstruction for claimants who participated in the nuclear rocket re-entries incorporated as a page change into the revision of NTS-6 Rev. 1.

MR. PRESLEY: Okay.

MR. ROLFES: I looked over that before and I apologize, and it appears that that was documented in Section 6.5.1 and 6.5.2.

MR. PRESLEY: Okay.

MR. ROLFES: Okay. Number four, the -- regarding the ingestion of non-respirable hot particles.

MR. PRESLEY: Uh-huh.

MR. ROLFES: All right. We -- this is the individual that we spoke with, the health physicist that oversaw the operations at the Nuclear Rocket Development Station. He indicated that no hot particle ingestion occurred, to his knowledge -- or based on any of the information that he had associated with the monitoring following the events -- the re-entry events. We believe that the status of this is closed as well.

MR. PRESLEY: Okay. Now we talked about this at extensive length. Arjun --

MS. MUNN: Yeah, we sure did. Was this -- this was the one we had said there was new information, newly unearthed reports to be reviewed and an expanded OCAS response is -- is -- is this -- is this the newly unearthed reports that we had discussed (unintelligible) --

MR. ROLFES: Many of the reports that we do have are on-site radiological safety reports for the specific nuclear rocket development work that was done at the Test Site, and also interviews with the health physicist that oversaw the -- the radiation exposure potential and controls of the site operations.

MS. MUNN: Sounds like a good expanded response. Thank you.

MR. ROLFES: Okay, thanks.

MR. PRESLEY: Arjun?

DR. MAKHIJANI: Yeah, for this item four -- well, again, it's the same thing. It's in the Chapter 5, Rev. 01, which we have not seen and have not been asked to review.

DR. MAURO: And this is John, too. I -- in

effect, the case being made here is very similar to -- we talked about before. There are controls in place that would preclude a person from inadvertently ingesting a hot particle. But the last paragraph in your response also goes on to say however, if for some reason you decide that you would want to, for example, calculate the dose to the lungs from a hot particle -- we'll stick to the internal right now -- as you say in your write-up, in that paragraph, that you know, there are methods to do that and you make reference to this -- an NRDL report. Now, again I would like to ask when -- when you're doing that -- this is exactly the same issue we talked about before with the skin, but now we're talking about a particle that might have been inhaled or ingested that -- recognizing that the controls are in place, that such a scenario really can't happen, but you do acknowledge that there may be certain cases, on a case-by-case basis, where you'll need to address that issue and use methodologies to derive those doses, as you indicated in your write-up. Again I would ask -- I'd like to know -- learn

a little bit more about how that's done. That is, when you derive dose to the lung from a hot particle, unlike -- you know, unlike an external dose or inhalation of a -- of a -- of a -- a plutonium, when a particle is distributed throughout the lung and you go through your standard dose reconstruction and standard IREP method. In this case we're talking about hot particles and I guess I'd like to hear a little bit about how the dose reconstruction's done and the probability of causation, just like we talked about with the skin.

MR. ROLFES: At this time the standard biokinetic models would be used to interpret bioassay data for estimating a dose to any particular organ in which a cancer would develop in the future. So right now at this time we have nothing that would change, essentially, on the interpretation of a particular piece of either direct or indirect radiobioassay.

DR. MAURO: It's a (unintelligible), so in effect you're saying that if a chest count were taken or a bioassay sample were taken and you -

- you saw a positive result --
MR. ROLFES: Uh-huh.
DR. MAURO: -- you would -- you just (unintelligible) methods, IMBA, to determine the dose to the organ of concern -- let's say in this case the lung -- and there's be business as usual. This would apply whether or not there was reason to believe that that body burden or what was inhaled was -- was just a -- a fume or a vapor or very -- you know, a one -- a -- very small particles or you ingest it and possibly a -- now I'm not sure if you would inhale I guess a hot particle. I don't even know if that's a real scenario because the particle would have to be --
DR. MAKHIJANI: No, it's not. We're talking about non-respirable ingestion.
DR. MAURO: Okay, so this is -- okay, so the reference to the lung here doesn't really apply.
DR. MAKHIJANI: No.
DR. MAURO: I guess it would be more a GI tract issue then.
DR. MAKHIJANI: Yes.
DR. MAURO: Okay. Then that goes to the GI

tract if -- I just wanted to make sure I understand the position you're talking, and I'm not saying that I agree or disagree with it, I'm just saying that -- so you're saying that if a person were in a circumstance where there was a possibility where he might have ingested a relatively large hot particle, you're say-- now I understand your argument is well, that scenario isn't very realistic, but then you do go on to say in the write-up that however, if there is there is something in his records that says that well, this might have occurred, you're going to treat the -- that person -- you know, let's say just use his bioassay data as normal and reconstruct the dose, let's say to his GI tract, the same way you would any other person that had a positive bioassay or whole body count.

DR. MAKHIJANI: Well, let me just make a comment to what Mark said, is in this last paragraph of item four --

UNIDENTIFIED: We haven't --

DR. MAKHIJANI: -- we haven't reviewed this, I'm just responding to the last paragraph --

DR. MAURO: Me, too, yeah.

DR. MAKHIJANI: -- that doses could be calculated based on the NRDS approach, or if that information is not available on OCAS IG-002, which is the IMBA EXPERT (unintelligible), which is the normal way of doing dose reconstruction for internal dose, I'm -- I'm -- on the face of it, from -- from having read the Naval reactor documents, I'm not convinced at all that these two methods are equivalent for the GI tract. In fact, I suspect that they would give you rather different answers for the same parameters for hot particle ingestion.

MR. ROLFES: The -- the likelihood, once again, of this occurrence is so, so minuscule, and that hasn't been reiterated enough because the number of people that were involved in these re-entries were typically about ten. So in comparison to the total number of individuals that worked on-site at Nevada Test Site and associated with a particular project where a hot particle exposure could have occurred, we've -- we've rapidly eliminated the -- more than 99 percent of individuals that worked on-site. This -- you know, we -- we're talking about people that, once again, were in

respirators, so it's very unlikely that an individual could have potentially ingested a hot particle. Once again the bottom line is that we have methods to assign dose based on a -- a -- exposure, however unlikely it may be; the methodology does exist.

DR. MAKHIJANI: Yeah, all -- all I'm saying -- I'm not -- I'm not commenting on whether it would likely or not. All I'm saying is that you have proposed two approaches for calculating the dose for the same thing, and on the face of it, I suspect that they're not at all equivalents. That's all. If you ever have to calculate a dose and -- and you try to do it by these two methods, I don't think you'll come up with the same number.

MR. ROLFES: Okay. And --

MR. SMITH: Mark -- Mark, this is Billy.

MR. ROLFES: Yes.

MR. SMITH: Arjun is -- is absolutely correct. I've gone through the NRDL report in detail and looked at the model, and actually gone through sample calculations as to how an internal dose would be calculated using the NRDL model --

MR. ROLFES: Uh-huh.

MR. SMITH: -- and the IMBA code is a much more current code, you know, relying in ICRP-66 --

MR. ROLFES: 66 and 68, yes.

MR. SMITH: -- values. But yes, you would probably get different numbers. And I'm sure that if the case does occur, that the most conservative (unintelligible) against the higher dose would be applied to the particular claimant to give him the benefit of the doubt. There's no argument that the models are identical. They are not identical. But -- and we recognize that.

MR. ROLFES: Yes, we would certainly rely on the biokinetic parameters associated with the more recent ICRP models. However, there may be technical parameters regarding potential particle sizes, et cetera, and radionuclides of concern in the other -- in the other reference, such as the NRDL report that we're referring to.

MR. SMITH: Yeah.

DR. MAKHIJANI: All I -- all I want to say is that I -- I have some reservations about this last paragraph.

DR. MAURO: Me -- me, too. Me -- I -- I feel

as if -- right now if I were asked to do a dose reconstruction to a person that we have some bioassay data, but we also have reason to suspect that he may have ingested some hot par- - hot particles that were relatively insoluble and -- and they -- that could have lodged in the GI tract, quite frankly I'm not sure how I would do that dose calculation. Certainly I don't think I would use the bioassay results to predict what the dose would -- localized dose might have been to the GI tract --

MR. ROLFES: Okay.

DR. MAURO: -- see -- see my -- it's the same thing as the skin.

MR. ROLFES: Which insoluble hot particles would you be --

DR. MAURO: I -- I -- no, no, I --

MR. ROLFES: -- referring to?

DR. MAURO: -- I don't know if that's a real scenario. I mean I -- I'm prepared to accept your position that that scenario is non-existent, it can't occur because of the access and egress controls, respiratory protection, et cetera. And if that's the case, that's fine, and you've made your case that that's the case

and this problem's put to bed. But if you do say that well, we do acknowledge that there may be certain cases, on a case-by-case basis, where we're going to have to deal with this problem, what -- and actually reconstruct the dose to the GI tract from the -- the ingestion of some insoluble hot particles. If that scenario does make its way to a dose reconstruction, it's not clear to me how you would do that. And now whether or not we -- you need to specify that at this time for this purposes or simply say that there are methods available that we would draw upon and use the ones most appropriate and make reference to what those methods are, that may be sufficient. But right now I just don't know what those methods are.

MR. ROLFES: Okay. So if we had to complete a dose reconstruction for an individual, a hypothetical individual, that ingested a hot particle, I think it would be more appropriate to address that issue when we come to it rather than trying to address something that has such a low likelihood of occurrence --

DR. MAURO: Okay.

MR. ROLFES: -- right now.
DR. MAURO: And -- and -- and I --
DR. MAKHIJANI: It is in your -- it is in your revised site profile. Right?
MR. ROLFES: What's that?
DR. MAKHIJANI: Well, I -- I'm just -- I'm just looking at what's on the paper here. It says addressed in NTS-5 Rev. 01, and I -- I think -- I think at the present time maybe -- maybe -- at least I would want to leave it right there and just to react to this paragraph and say that we have not reviewed --
MR. ROLFES: Okay.
DR. MAKHIJANI: -- Rev. 01, that's it.
MR. PRESLEY: Okay. Again, I think we have talked about this and talked about it. Working group, what's your wish on -- on comment four?
MS. MUNN: Well, this is Wanda. I'm prepared to accept it. I'm a little concerned that we don't have the revision to look at. That's -- you know, it's one of those things that we find ourselves taking from time to time when we all have time constraints and they don't fall out in the proper order. I'm certainly willing to accept the agency's statement that they have

addressed it in NTS-5 Rev. 1, if that -- Mark, do you feel that -- well, you and Gene are the experts on that. Are -- are the words essentially bearing the sense of what we just discussed? That is to say, this will be addressed on an individual basis in the unlikely occurrence that it should arise.

MR. ROLFES: Let's see -- Gene, do you have that section in front of you?

MS. MUNN: 5.6.5.3, yeah -- that...

MR. ROLFES: Gene?

(No responses)

Hello, Gene? Sorry.

MR. PRESLEY: I wonder if he's muted his phone.

MR. ROLFES: Let's see here, if we could hang on just a second --

MR. PRESLEY: Yeah.

MR. ROLFES: -- if I can have a minute I will pull up -- or actually Laurie Arent --

MS. ARENT: Yes, I'm here.

MR. ROLFES: Okay. Do you recall if -- what language we have added to NTS-5 Rev. 1 --

MS. ARENT: It's essentially what it says on the matrix.

MR. ROLFES: Okay.

MS. ARENT: As far as I can (break in transmission) looking at it right here, it looks verbatim.

MR. ROLFES: Okay.

MS. MUNN: So the words, dose reconstructors may consider using the models and methods in the NRDL report (break in transmission) this information is available for NRDS workers, internal exposures can be addressed through OCAS IG-002 and the IMBA EXPERT codes.

MS. ARENT: Yes.

MS. MUNN: And is -- is that wording acceptable to our contractor?

DR. MAKHIJANI: Well, Ms. Munn, as I said, the last paragraph in that three-paragraph statement --

MS. MUNN: Yeah.

DR. MAKHIJANI: -- I'm -- I'm uneasy about because I don't think those two methods would be equitable in results, and I don't -- and I (unintelligible) that we -- we're not sure how you would calculate that dose, so -- so currently we're not comfortable with what's on the page and haven't reviewed any of the underlying reasoning.

MR. ROLFES: Okay. Keep in mind, Arjun, that when we complete a dose reconstruction using an individual's DOE response information -- for example, when we interpret a whole body count result, we have the options of using ingestion or inhalation pathways as -- and additionally injection or wound entry. So when we complete a dose reconstruction we do consider all those pathways, and there's nothing that prevents us from -- you know, we wouldn't handle this case any differently than any other case.

DR. MAKHIJANI: Well -- well, the -- the point of the review when we wrote it in December 2005 was if you review the NRDL document, the -- it's quite persuasive that if such a thing did happen that you would have to treat it differently because you're -- you're producing very high doses locally in a way that would not be reflected necessarily in the way IMBA works, especially for urinalysis. And that's why I'm reiterating that -- that I'm uncomfortable with this because the whole point of raising this issue was that you would not pick up this kind of internal dose in your normal dose reconstruction.

DR. MAURO: You have to realize these -- the dose to the GI tract from a particle that may deposit in their -- the GI tract really should be thought of as part of -- is not internal to the body. It's -- in fact when I studied, you know, physiology and anatomy, it's always a good -- it's just a pocket that certainly -- that can -- it's like depositing on your skin. It's no different. Other words, if you ingest a particle that is relatively insoluble and let's say -- let's say that scenario does occur, it's the same exact problem as if it's deposited on your skin and -- and -- and the question is -- and -- and it's a -- as long as you consider that the scenario is plausible and you do have the wherewithal, the tools, the methodologies to calculate the dose, and then how you would use that dose to transfer that to a probability of causation, and let's say there are methods to do that, I -- I -- I'm not familiar with them, but if there are methods to do that and you're going to be adopting those methods on a case-by-case basis, that -- that's fine. But as Arjun pointed out, we -- we haven't looked at any of that and we're not --

I -- I'm not familiar with it. It may be -- it may be techniques that are well established in the health physics community to -- to -- I know we can do the dose using VARSKIN. I -- I'm not going to -- I mean you could actually, in theory, apply VARSKIN to the GI tract, say listen, this particle of a certain dimension and certain activity was ingested and deposited someplace in the GI tract and you wanted to get a dose rate, you could run VARSKIN there also, in theory. But I'm more con-- I guess my question goes okay, you just calculated this very, very high dose to a very, very small area in the GI tract and the person --

MR. ROLFES: Well --

DR. MAURO: -- does have GI tract cancer --

MR. ROLFES: Well --

DR. MAURO: -- I'm not quite sure -- what do you do then?

MR. ROLFES: You need to --

DR. MAURO: To (unintelligible) probability of causation.

MR. ROLFES: You need to be very careful about making that statement because that particle is not going to stop and reside in one location

for any significant amount of time.

DR. MAURO: Okay.

MR. ROLFES: Recall that as you ingest something, it moves from your stomach after about an hour --

DR. MAURO: Okay.

MR. ROLFES: -- and then moves into your small intestine, into the -- I believe it's the duodenum first, followed by the jejunum and then into the ilium.

DR. MAURO: Yes.

MR. ROLFES: From there, after residence time of about six to eight hours, I believe it's moved into the large intestine and is moved into the large intestine -- it -- it may reside there for -- in between an hour and eight hours and --

DR. MAURO: (Unintelligible)

MR. ROLFES: -- this entire time period that this particle is moving through an individual's digestive tract system, it is undergoing radiological decay, and it is also being shielded by materials --

DR. MAURO: Right.

MR. ROLFES: -- such as waters or solids within

the GI tract. So this particle is not being deposited and residing within the GI tract. It is continuously moving.

DR. MAURO: Okay.

MR. ROLFES: So it is not one localized area that is being continuously exposed --

DR. MAURO: Okay, so I --

MR. ROLFES: -- through an ingestion.

DR. MAURO: -- I -- you know what, that's good. I accept that. So in effect what you're describing is a model of how you would go about -- it certainly is not -- it's not -- it's not IMBA. I mean it -- what you're saying is now -- we've got this particle that may or may not be in contact with any given location as it's moving through the system. I haven't thought through the problem and I haven't seen it written it up, but what you just des-- described to me certainly makes sense and there probably is a way to come to grips with how we're going to derive the doses, whether we're talking about skin or talking about this particle moving through the GI tract. And it may turn out to be a -- a relatively straightforward way of dealing with this. And

then once you do get some kind of dose, maybe you come up with an average dose to the GI tract as the particle passes through and the bolus that it's associated with and the self-shielding, so -- you would then of course -- then you have some estimate of the average dose to the -- to the -- whether it's the stomach, the esophagus or whatever different organ is the organ of concern, you're saying that you get a dose that way, not using IMBA nec-- I'm not sure that IMBA would do this for you or not, I'm not -- I'm not sure. And then from there you can get a probability of causation and so you're saying it is a tractable problem and you have the wherewithal to do it.

MR. ROLFES: That's correct. It can be done when necessary. And at this time we haven't seen a case where this is -- has become necessary.

DR. MAURO: Uh-huh, yeah.

DR. MAKHIJANI: Be -- be -- I -- I -- you know, I -- John, occasionally have to -- we have to do a public -- I -- I think, you know, if you -- some people have looked at the Naval Radiological Defense Lab document and maybe

some haven't --

DR. MAURO: I haven't.

DR. MAKHIJANI: -- and -- and there -- there is a method specified in there, it's not necessar- - it isn't the one that is specified in IMBA. It's -- I don't see any one-to-one correspondence, especially for using IMBA with bioassay, to -- to do what that model does. And all -- all I'm saying right now is that we are in a position to say, and it's been reaffirmed by -- by ORAU, is that these two things are not equivalent and so the statement that is in the matrix is not internally consistent. How it should be modified or whether it should be modified, whether the working group wants us to review it and write a memorandum on it or however, it is a question of course that the working group should address. But at this stage all we know is -- is -- is that that statement is internally not consistent, or appears not to be consistent, and -- and I think we should leave it at that because we haven't even seen volume five.

MR. SMITH: This is Billy. Arjun is -- is partially correct. I think what's not said in

this particular paragraph is that if people ingest hot particles from the rocket testing days -- because you need to be very careful in how you use the models that are described in the NRDL report, they are only -- that model is only specific to hot particles from the rocket test days.

MR. ROLFES: Correct.

MR. SMITH: IMBA itself can be used to determine what the GI tract doses are from other than NRDS tests, hence drill-backs and tunnel re-entries. So you know, it comes down to the dose reconstructor making the kind of determination as to where did this guy work, where did the hot particle come from, was it NRDL rocket testing or was it Nevada Test Site testing, and then they would choose the appropriate model to apply. They don't have to be consistent. We would just apply the particular model from the source where the hot particles came from.

DR. MAKHIJANI: Well, I -- I don't -- I only partly agree with that, because the point that was raised in our review is not that the test workers face an identical situation to reactor

workers. Of course not, there were -- there were different tests and different specific physical situations. But that -- there would be a similarity in that drill-back workers may ingest non-respirable -- non-respirable particles that contain short-lived radionuclides and therefore may produce high localized doses similar to what occurs with -- or what was postulated to be possible with the reactor tests, not that it would be identical. And under those circumstances, I think you'd have the same problem with using IMBA compared to -- because you've got significant localized doses, maybe not as high as calculated in the NRDL document, but significant.

MR. PRESLEY: Arjun, this is Bob Presley.

DR. MAKHIJANI: Yes, sir.

MR. PRESLEY: Your comments are noted.

DR. MAKHIJANI: Yeah.

MR. PRESLEY: Billy, appreciate your comments. I think that we can say that item four is closed based on the fact that this is for the NTS use. We've stated that one way will be used for the rocket tests and another way will be used for other internal exposures. And as

Mark said, there's not that many doses that will have to be done this way, so I would like to close this out, please. What -- what's the working group's thoughts on this?

MS. MUNN: Well, this is Wanda. I'm wondering if there is a simple way to revise the language of this last paragraph slightly in those last few sentences to better incorporate what I think I heard from Mark with respect to how these highly unlikely cases would be addressed if they do occur. It didn't sound to me as though there would be a cut and dried methodology that could be applied to all circumstances because each of these circumstances would be not only unlikely but quite different. Can we -- if there's -- if there's hesitance on anyone's part, can we fix it with language in the matrix, is my question.

MR. PRESLEY: Mark --

MR. ROLFES: Bob --

MR. PRESLEY: -- is there a simple fix to that last statement?

MR. ROLFES: Let's see, is this regarding if a worker who partici-- is it the last paragraph that you're referring to?

MS. MUNN: Yes, (unintelligible).
MR. ROLFES: Okay, as Laurie mentioned, this is what we have documented in the revision of the NTS-5 Rev. 1. If there is something that you would like us to look into or change in regarding to this language, then we could certainly take a look at doing so in order to resolve any potential outstanding comment.
MS. MUNN: I'm just not certain whether there's easy language to clarify that a little more in -- gosh, yeah. I -- I don't see that this has to be the same language as the report, although the report is the official document, is it not?
MR. PRESLEY: Correct.
MS. MUNN: That's what your dose reconstructor's going to look at?
MR. PRESLEY: You know, Wanda, with the language here, it says if this information is not available for the NRDS workers, then you know, internal exposures can be addressed through either OCAS IG-002 or the IMBA EXPERT codes, and the -- which are the -- the newest thing going.
MS. MUNN: Yes, I'm -- I guess the real question is, is this being interpreted

correctly by SC&A? I -- I -- when I read that I did not get the implication that the methodologies were likely to achieve similar results. I got the impression that different circumstances would require the use of -- of different methods. Is -- am I -- am I off-course here? Is that -- is that what you were saying, Arjun and John?

DR. MAURO: Yes, I -- well, the default to IMBA, lacking better methods or better information, doesn't seem to be the solution. That is, there are -- there are scenarios, as I understand it, where IMBA is really not going to serve us well and there may be other methods that may need to be applied, depending on the exposure situation for the ingested particle. So I guess -- my understanding -- so the language the way it is now really def-- eventually says well, listen, if worse comes to worst, just use IMBA. And my understanding is that IMBA may not serve us well when we're dealing with this ingested, relatively insoluble hot particle.

MS. MUNN: Yeah.

DR. MAURO: Do -- by the way, does -- does

NIOSH and ORAU agree that there are circumstances where IMBA may not be the best way to approach this problem?

MR. ROLFES: I would have to take a look at the facts of the case that we're dealing with and then make a decision based on the facts that we have at hand.

DR. MAURO: I agree with that, and maybe that's the words we need.

MR. ROLFES: Then that -- that's an unwritten -- that -- that may not be documented but, as you know, that's the first piece of information that we would consider in an individual's dose reconstruction, and those pieces of documentation are contained within the claimant's files.

DR. MAURO: The on-- the only concern is right now the words that really don't say that. They say default to IMBA. You know, push comes to shove, if you're at a loss, go to IMBA. And I guess the answer is well, not necessarily. There may -- there area circumstances where IMBA won't serve our purposes well here.

MS. MUNN: And that -- Mark, my primary concern here is the issue of our archives of what we

do.

MR. ROLFES: Uh-huh.

MS. MUNN: And if -- if the archive -- this matrix will turn out to be the archive of the workgroup.

MR. ROLFES: Correct.

MS. MUNN: And if we can in some way reflect the (unintelligible) of what this discussion has been about, and if we all -- if we're all in agreement that IMBA may not be the best default, that it's an individual issue, not necessarily a cut and dried decision with respect to which method to use, it -- if -- it just feels like it would make sense to choose our words for this closure matrix --

MR. ROLFES: Uh-huh.

MS. MUNN: -- in a slightly different way so that it emphasized that it's such an individual thing that no specific direction can be given until the individual case is in hand.

MR. ROLFES: Okay.

MS. MUNN: Which I believe is -- is that right, SC&A? Am I saying the right thing?

DR. MAURO: You -- my answer is yes, that -- that -- and it sounds like it -- pretty

straightforward. It's just some rewording here to alert the -- the dose reconstructor that -- that IMBA is not ne-- and as long as you folks -- you know, assum-- are in effect saying that, if -- if you believe that there are circumstances where IMBA really can't be used to do the dose reconstruction for this scenario, it should say that. Right now it doesn't say that.

MR. SMITH: Yeah, but what it does say -- this is Billy --

DR. MAURO: Okay.

MR. SMITH: -- it says that if there is a scenario where a person gets a hot particle from NRDS, they're going to use the NRDL model.

DR. MAURO: Correct, but --

MR. SMITH: If for some reason the information is not available that the NRDL model can be used, then they will look at another alternative, which is the IMBA code. Now I think the concern may be -- on SC&A's part is that the -- the probability that the IMBA code is going to give a lower dose than the NRDL model is going to give, so if you can't use the IMBA codes, then what model is the dose

reconstructor going to use if the NRDL --
DR. MAURO: Yes.
MR. SMITH: -- model is not appropriate --
DR. MAURO: Yeah, I --
MR. SMITH: -- (unintelligible) you don't have enough information.
DR. MAURO: Yeah, I -- I mean I'm not disagreeing with any -- with -- with you folks. It's just a matter -- if you're comfortable that the IMBA code could be used in a given circumstance, great. But I guess I'm visualizing if someone is going through this without giving some thought to wait a minute, IMBA really doesn't apply here and we don't have suf-- the -- you know, it does not necessarily have to be the NRDL report. I'm more concerned about -- and -- and when you're doing a dose reconstruction to the GI tract and it's a scenario where a person may have ingested a hot particle, a relatively hot particle that's insoluble, that they simply ask themselves the question -- and maybe this is how it's done -- well, listen, I think under these circumstances IMBA may not serve us well, may not be claimant favorable, and there are

other ways to deal with this. If -- if -- if you believe that's true, then I guess those words should say that. If you believe no, IMBA will serve us well, then that's fine, too. But right now it's a bit ambiguous exactly what the dose reconstructor is supposed to do when confronted with this scenario.

MR. ROLFES: Okay. So it sounds like me this -- to me this is more of, you know, how we would go about assigning dose from a particular exposure, which I really don't feel is appropriate to put into the Nevada Test Site SE-- or, excuse me, site profile because it's something that could impact other -- other sites, and it refers to how we interpret bioassay data or how we assign dose from a given exposure. And this is something that I think is detailed within the OCAS Implementation Guidelines that we've referenced here in the -- in the response.

MS. MUNN: I wouldn't recommending -- recommend anything in the site profile. I'm just looking specifically at the wording in the matrix, personally.

MR. ROLFES: Okay, okay, so you would like

information specific to the matrix that would clarify --

MS. MUNN: That was -- that was my thinking. I'm just --

MR. ROLFES: Okay.

MS. MUNN: -- concerned about the long-term archive of this workgroup and what we've agreed to.

MR. ROLFES: Okay.

MS. MUNN: And it -- there's been so much discussion on this -- on this situation that probably will never occur, but if it does occur, it would be helpful -- seems to me --

MR. ROLFES: Okay.

MS. MUNN: -- if there's something here on the -- the matrix that said essentially this isn't likely, we can't foresee this happening, but in the unlikely event that it does, we'll have to use the method that's appropriate for that -- that circumstance.

MR. ROLFES: Okay, so that's the language that you would like incorporated into the matrix here?

MS. MUNN: That was just my opinion.

DR. ROESSLER: Yes, I agree with Wanda. I

think the word "unlikely to occur" would -- as we come back to this and look at it again, would give a different perspective.

MR. ROLFES: Okay. Would -- would that be okay then if we, you know, documented, you know, the probability of such occurrence within the matrix, would that be responsive to -- to what your concern is?

MS. MUNN: It would to me --

MR. ROLFES: Okay.

MS. MUNN: -- and I'm not speaking of numerical or statistic probability, just --

MR. ROLFES: Okay.

MS. MUNN: -- just indicating that this -- no one expects this to happen --

MR. ROLFES: Okay.

MS. MUNN: -- given the controls that were in place. In the event that it did, it would have to be individual decision with respect to method for dose reconstruction.

MR. ROLFES: Okay. Gene or Laurie, could we incorporate that information, the -- you know, the probability of this occurrence, could we add some -- a simple statement into the matrix to indicate that we have considered the

likelihood of such a scenario?

MS. ARENT: Yes.

MR. ROLLINS: Mark, this is Gene. First I want to apologize for not responding to your last question. It wasn't that I'd fallen off the planet; there's just too many buttons on this telephone.

MS. MUNN: Phone technology is just a (unintelligible).

MR. ROLLINS: Yeah, I'm -- I'm marking up this matrix as we speak.

MR. PRESLEY: Okay, and --

MS. MUNN: That would be helpful and, from my perspective, if that rewording could just be sent out to -- to the working group, if the working group agrees on it, just add it to the matrix.

MR. PRESLEY: I have no problem with that.

MR. ROLFES: Okay.

MR. PRESLEY: That's just more for Mark to do.

MS. MUNN: Yes, I know.

MR. PRESLEY: Right here before Christmas.

MS. MUNN: Well, he has nothing to do between Christmas and New Year's.

MR. PRESLEY: I know better than that. Okay --

MR. ROLFES: That's what I'm here for, so if that's --

MR. PRESLEY: What we -- what we will do then is we will -- will be looking for wording added to the matrix --

MS. MUNN: Just clarification wording.

MR. PRESLEY: -- right, about the likelihood of this happening. And then if Mark will send that out, we will look at the wording. And if everybody has -- says it's okay, Mark, we'll send that back to you and -- and it'll be a go.

MR. ROLFES: All right. Okay, Mr. Presley, are we ready to move on here?

MR. PRESLEY: Yes, we are.

MR. ROLFES: Okay.

MR. PRESLEY: Let's go to --

DR. ROESSLER: Bob, I'm going to cut out for a minute -- this is Gen. I think I've burned out the battery on this phone. I'm going to switch to another one. So I'll bow back in shortly.

MR. PRESLEY: Okay.

DR. ROESSLER: But go ahead.

COMMENT FIVE: RESUSPENSION

MR. PRESLEY: All righty, we're going to start with -- or go back to 5-7, 15 and 23, has to do

with comments on the resumption (sic) model and resumption (sic) factors are not scientifically defendable (sic) or claimant favorable due to a variety of factors. Dose -- doses may be underestimated -- and then it goes through quite a few things here. Mark, I'm going to let you discuss this. This one that we have beat to death.

MR. ROLFES: Yes.

MS. MUNN: Oh, and one more thi-- Mark, this is Wanda.

MR. ROLFES: Yes, Wanda.

MS. MUNN: I -- I'm not at all sure that I have done my homework. I'm not sure I've read the white paper. When -- when did Gene do that white paper?

MR. ROLFES: Well, if you recall, there were several white papers or several drafts that we had put together. We had discussed and presented our initial methodology --

MS. MUNN: Yeah, I remember seeing the drafts, I just don't remember whether I ever actually saw the final document.

MR. ROLFES: Okay --

MS. MUNN: Gene, when did that -- that final

come through, do you know? I'm wondering if I can track it back quickly on my -- my computer and --

MR. ROLFES: Wanda, I can answer for Gene. There may not have been a final white paper sent on to the Advisory Board members. I'll let Gene respond to that in just a second, but the final version ultimately will be incorporated into the ambient exposure -- excuse me, the ambient -- excuse me, the environmental portion of the site profile, Chapter 4.

MS. MUNN: Yeah, I -- I'm -- I think it's a moot question anyhow because my -- my memory is that we had resolved all of the outstanding issues with resuspension, but I just didn't remember whether I had actually seen the final document. So it's -- it's probably not worth discussing.

MR. CLAWSON: Wanda, this is Brad. Not to mock your memory or anything else, but I remember the same thing, but when we closed this this was pending on the white paper, the final of the white paper, and I don't know if I have seen it yet either.

MR. ROLLINS: This is Gene Rollins. I believe the -- the initial draft was sent out because I can remember John Mauro asking me some questions, which indicated to me that he had read through it.

MS. MUNN: Right.

MR. ROLLINS: There is going to be another revision I'm working on currently that's going to address enriching the near field with the refractories and some of the correction factors for early fission products, as I'm calculating right now, are going to increase substantially. So -- but those correction factors will be put into the -- into the TBD, Chapter 4.

MS. MUNN: Oh, okay. When is that likely to be incorporated, do you know? Well, you don't know how -- when your new editions are going to be done.

MR. ROLLINS: I will say that the -- Chapter 4 is now in review. When that version is approved, I will immediately initiate a page change that will incorporate these new fission activation correction factors, and page changes typically don't take that long to get through.

MS. MUNN: Yeah. Do we -- do we have any hope

at all of having that on deck by the time we go to Las Vegas?

MR. ROLLINS: I'll let Mark field that question.

MS. MUNN: That just way (unintelligible).

MR. ROLFES: Well, you know, we are around the holiday season --

MS. MUNN: I know.

MR. ROLFES: -- and I know many people are in fact operating at a reduced budget right now and with a very high load of work. So I don't want to speak and say that we will be able to. We will certainly do our best to, as we always do. I -- I couldn't give you a -- a more detailed response as to a date that this might be finalized.

MS. MUNN: Yeah, well, I didn't want to press you. It's just -- it's just -- this is one of those key factors that we've worked with so long --

MR. ROLFES: Uh-huh.

MS. MUNN: -- it would really be nice to be able to say at Nevada that we've thrashed this one right down to the last nit and that it's all completely squared away and the documents

are currently updated as they should be. But if -- it's just a timing issue.

MR. ELLIOTT: Well, Wanda, this is Larry Elliott. As Mark and Gene have indicated, if -- if we possibly can and it's simply a page change and we can get all of that and the logic behind the page change reviewed in a timely manner, we'll do so. But Mark's correct in pointing out that -- that we're operating here under constrained resources at this time of the year, so -- and I'm not sure when this came over to us for review, but you know, there's -- there's a series of reviews it has to go through, so we'll try to get it there if we can.

MS. MUNN: I understand.

MR. ELLIOTT: If not, we'll be ready to explain its status currently at that time.

MS. MUNN: Good.

MR. PRESLEY: This is Bob Presley. If I remember correctly when we were in Cincinnati on the 25th we discussed this and -- and you all told us at that point that the likelihood of this being done by the time we went to NTS was almost slim and none. So you know, I

understand. The only thing we can ask is to do your best, which I know you will do, and we can go from there.

DR. MAURO: As a refresher -- this is John -- is Lynn Anspaugh still on the line? If he's not, I -- I'll -- I'll just -- 'cause he's been tracking this a little closer than I have, but I recall that there were three items that --

MS. MUNN: Uh-huh.

DR. MAURO: -- we had discussed, and let's see if I -- there may be more, but the ones that I -- my recollection is the number one you mentioned, which I think was by far the most important, that is the -- the fractionation issue, sounds like you've got that well in hand. That's great.

The other had to do with -- with -- I believe you were basing your model for inhalation on air sampling data that was collected at some time -- I (unintelligible) the year -- and then -- and I -- I remember one of our concerns is that, you know, when you were applying that to earlier years, let's say you wanted to go back to 1963, I think you were taking later data, air sampling data, and then sort of go back to

-- okay, what would the exposures be in 1963, '64, you know, and you went -- and the way I understood it is you went back in time and back-calculated what might -- what the mix would be for an earlier time using Hicks tables type approaches, know-- knowing if you have this much airborne activity, this mix of radionuclides in the air at this thumb, you'd theoretically go back to an earlier time and figure out not only the -- the ho-- your activity that would be because they decayed, but also other radionuclides that may have gone away. You could come -- you can reconstruct that. And I -- I believe -- I believe you -- did you do that in the white paper, or has that been done yet, this second issue?

MR. ROLLINS: This is Gene Rollins. John, the way we addressed -- we did address early fission activation products --

DR. MAURO: Yes.

MR. ROLLINS: -- using the -- using the Hicks data.

DR. MAURO: Okay.

MR. ROLLINS: And then that -- and that's what I just mentioned, that once we -- we have gone

back now and enriched the near field --

DR. MAURO: Okay, that -- you -- you mentioned the -- the fractionation issue and that -- which were a different problem, and that was the fact that -- you know, there's the fractionation issue --

MR. ROLLINS: Well, that all comes together because it also allows us to postulate what was there shortly after -- within months after detonation.

DR. MAURO: Okay, good, so -- so in -- in one -- in effect those -- these -- these issues which I have separately in my mind, I can see how you could -- they really come together as really a single issue.

MR. ROLLINS: Right.

DR. MAURO: Ok-- okay, and you're addressing that. Now there was another problem that I recall that -- there was some cleanup between the time that the air sample was taken and -- let's say you're going backwards in time now, apparently -- at least some -- and this was an issue that perhaps the -- there was a cleanup operation that took place, let's say between the mid-1960s and the later time period when

you have your air sampling data, and we were concerned that that -- and from that perspective, you know, you've got a problem. You know, how do you go backward -- how do you use more recent data to go backward if there was some cleanup in between. Is that a -- am I -- first of all, is my recollection correct that that was an issue we discussed? And if so, how -- do you have a way to deal with that?

MR. ROLFES: Yes, John, we did discuss that a bit and the cleanup was limited to, for example, picking up pieces of structural steel. It wasn't necessarily linked in any way to reducing the radionuclide inventory --

DR. MAURO: Ah --

MR. ROLFES: -- in the soil.

DR. MAURO: -- okay, I see what you're saying.

MS. MUNN: Yeah.

DR. MAURO: That's (break in transmission) --

MR. PRESLEY: This is Bob Presley. And if I remember correctly, on that discussion you all have all kinds of data on those later operations.

MS. MUNN: (Unintelligible) cleanup (unintelligible).

MR. PRESLEY: Yes.
MS. MUNN: (Unintelligible) pretty specific.
DR. MAURO: Yeah, that -- I wanted to make sure that these various items that we talked about earlier are not on your plate and being taken care of in this -- the new analysis, and it sounds like -- at least the ones I can recall. There may have been others, I -- I -- that's why I asked if Lynn might have been on the line. He may recall some of the others that we brought up at that time.
MS. MUNN: The key ones, though, were the three -- the three comments, 7, 15 and 23.
DR. MAURO: Okay.
MR. PRESLEY: Okay. We have a -- what does everybody want to do on the closure on this, on item 5-7, 15 and 23?
MS. MUNN: Well, we've agreed on the technical issues. It's just a question of administratively getting it into the document, and that's in process.
MR. PRESLEY: Yeah.
MS. MUNN: Resolved.
MR. PRESLEY: I think this ought to be closed and let them get it into the document. Anybody

have a problem with that?

DR. ROESSLER: No problem.

MR. SCHOFIELD: No.

MR. PRESLEY: All righty. Mark that as such.

MR. ROLFES: I did also want to remind everyone that this exposure scenario, the internal doses resulting from environmental intakes, is purely limited to the 1963 forward time period, so -- because of the SEC that was designated for the 1951 through 1962 time period.

MR. PRESLEY: All right.

DR. MAURO: Yeah, that -- that -- that -- yeah.

MR. PRESLEY: That was one of the things that we discussed. Okay?

MR. ROLLINS: And this is Gene Rollins again. I -- I do want to mention that the ambient intakes that are discussed in the white paper and have been incorporated into Chapter 4 of the TBD also include an ingestion pathway of 100 milligrams per day of contaminated soil, so I want you to keep that in mind as you move through this matrix 'cause I think that might come up again.

MS. MUNN: Oh, that's good information. Thank you.

MR. PRESLEY: It -- it will, later on.

DR. MAURO: Good number, 100 milligrams a day. We're -- that has been a subject of longstanding disc-- debate and we've been pushing for that and that's certainly a bounding assumption.

MS. MUNN: It certainly would be a major bounding assumption.

MR. PRESLEY: It comes up, if I remember correctly, about 17, I think.

COMMENTS EIGHT/NINE: USE OF 1967 DATA FOR 1963-1966

Okay, let's go on to 8 and 9, the use of 1967 external dose data for 1963 through 1966 is not claimant favorable. There was no test in '67 with measurable off-site fallout. Mark, do you want to comment on this, please?

MR. ROLFES: Well, the information that we have put together is now in Nevada Test Site Chapter 6, Revision 1, Page Change 1 -- and let me verify, I do believe that that has been approved. Let me check on my last page. Actually that is still internal as well, so it has not been approved yet formally. Let's see, the -- in our response in this category for 8 and 9 is that unexposed control films and TLDs

were processed with personal dosimeters, and the readings from these control dosimeters were subtracted from personal dosimeter readings to attain a net reading for determining exposures. Beginning in April of 1957 all employees that entered NTS were required to wear a dosimeter while inside NTS. Because control dosimeters were maintained in environmentally-controlled, low background areas, exposure resulting from elevated ambient environmental levels from testing activities in other areas of the site would have been included in the individual exposure records. So ambient doses are no longer being assigned after 1957 due to capture by the universal badging and personal dosimetry that was in place. So we show that this is closed as well.

DR. MAURO: Bob, let me just make sure I -- so the need to go -- to extrapolate backwards in time is no longer necessary.

MR. ROLFES: Correct.

DR. MAURO: Okay, that's very important. You actually have data for the earlier years, I guess this 1963 to '66, so you're not going to use 1967 data, external data, to reconstruct

doses for people exposed from '63 to '66. You actually have real data.

MR. ROLFES: Correct.

DR. MAURO: Oh, okay.

MR. PRESLEY: Okay.

MS. MUNN: Resolved.

MR. PRESLEY: Yes? Somebody holler "Bob"?

MS. MUNN: No, I just said "resolved."

COMMENT TEN: PRE-1963 EXTERNAL ENVIRONMENTAL DOSE

MR. PRESLEY: Yes. Okay, let's move on to comment 10, TBD does not provide any guidance for pre-1963 external environmental dose, and we touched on that just a few minutes ago. Mark, you want to go back over that?

MR. ROLFES: I think this speaks to what we had just stated as well, so I think this could have been incorporated in the previous comment as well, and our response is essentially the same.

MR. PRESLEY: Yes.

DR. MAKHIJANI: Yeah, I agree. This is Arjun.

MR. PRESLEY: Arjun, you have any -- you agree?

DR. MAKHIJANI: Yes, sir.

MR. PRESLEY: So we're going to call this one closed and resolved.

And when we do -- when we redo this, Mark, how

about putting those together, 8, 9 and 10, could you, please?

MR. ROLFES: We certainly can.

MR. PRESLEY: I appreciate that.

DR. MAURO: Now I know that there is an SEC issue dealing -- I just want to make sure there's no cross-wiring here -- there is an SEC issue that we're currently looking at very closely related to whether workers did not wear their -- their film badges.

DR. MAKHIJANI: That's separate, John.

DR. MAURO: That's separate, so -- I just want to make sure everybody's comfortable that -- that issue's --

DR. MAKHIJANI: That's a separate issue.

DR. MAURO: Clearly SEC, nothing to do here. Good, okay. Thank you.

MR. ROLFES: And we will address that in number 20 of the matrix, and I did send out a separate e-mail with an attachment that will further elaborate on the analysis that we completed to determine if this was in fact a -- a -- you know, a -- an occurrence that was frequent or infrequent, so --

DR. MAURO: Oh, is that the separate e-mail

that had all the graphs on it?

MR. ROLFES: Yes, correct.

DR. MAURO: Okay, I have that. Good, thank you.

DR. MAKHIJANI: Mr. -- Mr. Presley, may I interrupt? I -- I did not realize this call was going to go on the whole day and I have scheduled something at 2:00 o'clock and I will need to go for about an hour. I just needed to say that item 11 we have not reviewed before and it is under review as we discussed in the previous working group meeting, and I'll submit that to you or SC&A will submit that to you before the end of the year -- or -- or in the first days of the next -- well before the next Board meeting.

MR. PRESLEY: Okay.

DR. MAKHIJANI: And I will -- I hope to be back in about an hour.

MS. MUNN: (Unintelligible)

MR. PRESLEY: You want to skip 11 for the time being?

MS. MUNN: (Unintelligible) have Arjun on (unintelligible).

COMMENT TWELVE: RADON DOSE IN G-TUNNELS

MR. PRESLEY: All righty. Let's go to 12, and that's radon dose in G-tunnels are not claimant favorable, has to do with the Gravel Gerties and, Mark, I'll let you go --

MR. ROLFES: Okay.

MR. PRESLEY: -- do this, but if y'all will remember, we've had quite a few discussions on this and this was put to bed at the last meeting.

MR. ROLFES: Yes. I did want to indicate that we have addressed radon doses in G-tunnel. We did revise those and they are more claimant favorable than they previously were. We also have guidance to the dose reconstructors regarding Gravel Gertie radon exposures. That was also updated in the TBD and this information is contained in the Chapter 4, Revision 1, Section 4.4.3 and 4.4.4, and that is the section of the Technical Basis Document that is currently at OCAS for review.

MR. PRESLEY: Okay. Does anybody have a problem with that? John, you're all right?

DR. MAURO: Yeah, I mean it sounds like that you actually have radon measurements. Could you just give me conceptually the solution?

Other words --

MR. ROLFES: I'll let Gene speak to that. I do believe that we increased the concentration of the working level based on -- well, I'll let Gene explain.

MR. ROLLINS: This is Gene Rollins. What -- what -- what I had done previously was -- the work location was unknown. I had recommended using a lower value than the maximum value that was -- had been reported in G-tunnel --

DR. MAURO: Oh, okay.

MR. ROLLINS: -- and so all I did was just change the document such that for unknown locations that we would use the maximum value.

DR. MAURO: Okay, and approximately how many measurements were made that -- upon which you base that? Are we talking about a handful or a large number of measurements?

MR. ROLLINS: I -- I -- it was only one report -- or actually there were two reports that were done over a period of two years. I would have to guess -- they did them in each of the tunnels, probab-- I -- I'd have to guess maybe 20 measurements per tunnel.

DR. MAURO: Okay. Okay, so you had a large

number of measurements. That -- that strategy -- the idea of taking the high end value of the distribution of values is -- as your universal is -- is really appropriate.

MR. PRESLEY: Okay. Working group, anybody have a problem marking that closed and resolved?

MR. CLAWSON: This is Brad, I have no problem with it.

MR. PRESLEY: Okay.

DR. ROESSLER: No problem.

MR. PRESLEY: All righty.

MR. SCHOFIELD: No problem.

COMMENT THIRTEEN: IODINE-131

MR. PRESLEY: All righty, let's go to 13, the environmental dose due to -- doses due to I-1-- or -- not I --

MR. ROLFES: Iodine-131.

MR. PRESLEY: -- Iodine-131, I was having a senior moment there, needs to be taken into account for non-monitoring (sic) workers. This is also one that we looked at and, Mark, you want to comment on that?

MR. ROLFES: Sure. We did develop guidance for unmonitored workers that would bound potential

organ doses from radioiodine exposures, and we did incorporate a sample bounding calculation based on the highest concentrations that were measured -- for example, for the Baneberry event, the highest concentrations that were measured in Area 12 Camp following that release -- and these sample calculations -- excuse me, I can't speak, either, today -- are addressed in the NTS Chapter 5, Revision 1 in that Section 5.3.3.1.

DR. MAURO: Mark, a quick question for you. When you used the measured data -- I presume the -- it was an air sample that looked specifically for iodine-131. Is that correct?

MR. ROLFES: Well, I would have to take a look. However, as you know, there could have been other radioiodines that were involved in --

DR. MAURO: That's why I asked.

MR. ROLFES: -- in any venting.

DR. MAURO: My -- my experience is that shortly after a test or an expl-- the major contributor to the thyroid dose -- or not -- is not iodine-131 but iodine-132, 33, 34, 35 -- it's about a -- they contribute maybe as much as seven or eight-fold higher dose.

MR. ROLFES: That's very possible, depending upon the time following --

DR. MAURO: You're tal-- exactly.

MR. ROLFES: -- the exposure.

DR. MAURO: My only -- my only concern I guess is that when -- in this protocol that's been adopted, that it includes consideration of the time period following -- you know, when the air sample was taken, if it was an air sample, and -- and factored in there might have been these other shorter-lived iodines also that are -- not maybe, there certainly was, if it was soon after the event. They could be the major contributor to the dose to the thyroid gland.

MR. ROLFES: It -- once again, depending upon the time, those radioiodines would be detectable by gamma spectroscopy of an air filter. The -- for example, there are cases where an individual was exposed to a radioiodine and was surveyed, found to be contaminated and was taken for a whole body count following this exposure. And I have seen in the records that all three potential radioiodines that he was exposed to were accounted for and credited. He was in fact

credited with dose for those exposures. So that information is in fact known, so --

DR. MAURO: Okay, that -- yeah, as long as that protocol doesn't, you know, ignore the short-lived, then we're fine.

MR. SMITH: Mark -- Mark, this is Billy. Generally these people were either -- direct thyroid counting for sodium iodide crystals or whole body counted, but generally we -- we were evaluating the thyroid gland, we were looking -- I mean iodine-131 -- radioiodine in the thyroid, we did a thyroid count.

MR. ROLFES: Okay. Thank you.

DR. MAURO: Yeah, but see, what we ran into is very often -- let's say a thyroid scanned for the correct count would be looking particularly for iodine-131, because several days later -- if that's when it's done -- you're going to lose a lot of the short-lived, and the exposure -- so therefore you end up seeing the iodine-131 as being the only major -- only important contributor, when in fact the majority of the dose might have been delivered by the short-lived iodines that he experienced and which have long since disappeared, you know, sev--

'cause several days later they -- several of them are not going to be there. And that was -- those are only -- we're not saying that was -- wasn't factored in, but I'm just -- I guess my question is if you're basing your -- your dose reconstruction on either air samples or are based on a thyroid scan, that the short-lived iodines are factored into the dose reconstruction.

MR. ROLFES: When exposures could have occurred, they certainly are incorporated into a dose assessment. Typically when we have a positive bioassay result for an individual that was exposed, I have seen sample calculations that were done for particular claimants from Nevada Test Site or particular workers from Nevada Test Site where -- essentially I believe it was isotopic data from like the Hicks tables that were used to assign intakes of other radionuclides associated with this individual's exposure at a given time following a test.

DR. MAURO: Excellent, that -- that's -- that's -- you know, I -- I made reference to the shorter-lived iodines, but certainly the full suite of -- when you get to the shortly after -

- the air -- the radionuclides of airborne, going to the Hicks tables will allow you -- especially if you have only one radionuclide you measured, in theory you could predict what every other radionuclide was as a function of time that the person might have been exposed to. Yes.

DR. ANSPAUGH: This is Lynn Anspaugh back for just a minute. You know, there -- there are REECo reports that calculated the doses, and I think the highest one was 4 rem to the thyroid. And I -- I believe REECo did a pretty good job of documenting all that and including short-lived radioiodines (break in transmission) that's a little bit of concern is whether or not there might have been a dose to the GI tract that wasn't calculated and might be of some interest in some particular cases. (Unintelligible) on the phone he might have a few comments about that. I don't know what was an issue of concern at the time or not.

MR. ROLFES: Well, Lynn -- this is Mark Rolfes -- and for example, if we do have doses calculated to the thyroid, our Integrated Modules for Bioassay Analysis program allows us

to calculate doses to any other organ within the body. So that really wouldn't be an issue that would belong in a site profile, but rather would certainly be documented in an IMBA calculation when necessary.

MR. PRESLEY: Okay, does anybody -- anybody have a problem with this? I believe that's -- can I mark 13 closed and resolved?

MS. MUNN: Sounds resolved.

COMMENT FOURTEEN: INTERNAL MONITORING

MR. PRESLEY: Okay, let's go to 14. There are no internal monitoring data till late 1955 or 1956, some plutonium from then, and then it says plutonium from then on, some tritium from '58, plutonium, tritium and mixed fusion (sic) products from 1961. Mark, do you want to talk about (unintelligible) --

MR. ROLFES: Certainly. I do want to point out once again and reiterate that there is an SEC in place for the years 1951 through the end of 1962, so the earlier internal monitoring issue is moot at this point.

As it pertains to the 1963 time period forward, we do have bioassay data for individuals, and we have a claimant-favorable methodology to

interpret that bioassay data in place. So let's see, I believe we have -- let's see, I'm just taking a look at the rest of our response here, and we did agree to putting that guidance for interpreting those fission product bioassay results and gross alpha bioassay results into the site profile, or into the TBD this is addressed in, the Nevada Test Site Chapter 5, Revision 1, and it's specific to section 5.6.3.

MS. MUNN: (Unintelligible)

MR. PRESLEY: Good. Yeah, I remember discussing that last time. Okay --

MR. ROLFES: And with one other thing --

MR. PRESLEY: All right.

MR. ROLFES: -- there are also -- whole body counting on site did become routine in 1967. Prior to 1967 there were (break in transmission) counts conducted as well, so that information is available. But I thought that that was appropriate to add that as well, so...

DR. ROESSLER: Mark?

MR. PRESLEY: Okay, go ahead somebody.

DR. ROESSLER: It's Gen. The SC&A comment mentions plutonium from then on, so I assume in

the -- in your methodology you have handled that also.

MR. ROLFES: Well, we -- we have indicated that we have a methodology to interpret gross alpha bioassay data, so that would incorporate a plutonium exposure such as plutonium-239, 240.

DR. ROESSLER: Okay. Okay.

DR. MAURO: So you -- so you -- what I'm hearing is you have data from '63 to '67 --

MR. ROLFES: Yes.

DR. MAURO: -- it might be limited, but sufficient to build a coworker model.

MR. ROLFES: Yes, if needed, there is information to allow us to assign internal doses for the people that were directly involved with and had a potential for exposures to the radionuclides of concern.

MR. PRESLEY: Okay, anybody else have anything else?

MR. CLAWSON: Well, Mark, this is just Brad. I just want to make sure -- now the earlier years are under the SEC. Right?

MR. ROLFES: That's correct, up until the end of 1962.

MR. CLAWSON: '62, okay. I just wanted to make

sure (unintelligible) --

MR. PRESLEY: '51 to '62. Okay?

DR. ANSPAUGH: This -- this is Lynn Anspaugh again. I'm a little bit confused on this issue. If somebody didn't work there 250 days, then you still have to do a dose reconstruction. Right?

MR. PRESLEY: Now --

MR. ROLFES: However we would not assign internal doses to that individual because of the SEC that was designated, so we would only be limited to assigning external doses to the individual.

DR. MAURO: Yeah, I would be able to help out a little bit here. On the 250-day workgroup we're explicitly addressing the possibility and the plausibility of reconstructing doses for short-term exposures, so it -- it -- an interesting development is that it may be plausible to reconstruct short-term internal exposures, and it's being looked at right now as part of the 250-workday investigation, which is an SEC issue.

MR. PRESLEY: Okay.

MR. CLAWSON: (Unintelligible), you know, I

understood that. But Bob, didn't we, with the 250 days for NTS, wasn't it -- didn't we come up with a -- because the people were living out there 24/7, we did --

DR. ROESSLER: No, that was another -- I think that was another scenario, wasn't it?

MR. PRESLEY: Yes, but it -- it had -- it had the same thing as this right here. Didn't we come up with --

MR. CLAWSON: Like 89 days or --

DR. MAURO: 83, yeah. It's really not 250 days, it's 83 work -- 83 calendar days.

MR. PRESLEY: Yeah, right, right, that's exactly what it was.

MR. CLAWSON: I just wanted to make sure (unintelligible) --

MS. HOMOKI-TITUS: Hi, this is Liz, I'm sorry to interrupt. That was actually a decision, just to be clear, that has to be made by the Department of Labor.

MR. PRESLEY: Right.

MS. HOMOKI-TITUS: It wasn't made by HHS.

MR. PRESLEY: Right.

MR. ROLFES: That's correct.

MR. PRESLEY: Yeah, that was made by the

Department of Labor, to go with an 83-day, as I remember -- correct.

MR. CLAWSON: Okay.

COMMENT SIXTEEN: USE OF PHOTON DOSE

MR. PRESLEY: Okay, let's move on to 16, use of photon dose as done by DTRA as a basis of estimating internal doses during periods when there are no data or scattered internal monitoring data. Mark, do you want to -- this is something that we -- again, that we've taken care of, but you want to --

MR. ROLFES: That's --

MR. PRESLEY: -- kind of elaborate on it just a little bit?

MR. ROLFES: Correct, and that was -- that was certainly investigated early on during the atmospheric weapons testing days or device testing days and we have not pursued that any further because we ended up designating the SEC for the 1951 through 1962 time period.

MR. PRESLEY: Okay, we want to mark that closed. All righty.

COMMENT SEVENTEEN: INGESTION DOSES

Go on to 17, ingestion doses need to be better evaluated, and you want to --

MR. ROLFES: And as Gene had indicated previously, the environmental section of the site profile does now include a very claimant-favorable ingestion pathway of 100 milligrams per day of contaminated soil, so we feel that that issue is closed.

MR. PRESLEY: John, do you have a comment on that?

DR. MAURO: I fully agree that's the way to close this one.

COMMENT EIGHTEEN: OTIB-002

MR. PRESLEY: All righty. Going to 18, recommended use of OTIB-002 for the post-1971 tunnel re-entry workers, and Mark, do you want to --

MR. ROLFES: Okay.

MR. PRESLEY: -- comment on that?

MR. ROLFES: We did change some of the language which indicates that dose reconstructors should observe the limitations of the approach contained in maximum internal dose estimates for DOE complex claims, and any contrary instructions have been removed from the site profile for Nevada Test Site. So we feel this issue is closed.

MR. PRESLEY: And that's been addressed in Revision 5 (sic).

MR. ROLFES: Correct.

MR. PRESLEY: Okay, does anybody have anything about that?

MR. SCHOFIELD: No.

MR. PRESLEY: John, are you all right with --

DR. MAURO: Oh, absolutely. We were just concerned if they were applying OTIB-2 to a situation where it wasn't appropriate, and it sounds like that's been resolved.

COMMENT NINETEEN: PRE-1966 BETA DOSES

MR. PRESLEY: Right. Going to 19, there are no beta dose data until 1966, the TBD dose not specified or specifically a procedure for estimating pre-1966 beta doses. Mark?

MR. ROLFES: Okay, I will read from what we've got here in our response, and we do have time-dependent beta-gamma ratios that have been developed and were added to the Technical Basis Document. We're also looking into the development of a method using Hicks data for the tower and surface shots. Let's see, we also -- as I had reported to you at the last working group meeting, we had looked through

200 claimant external dosimetry files and evaluated their data to determine whether there were positive neutron, beta and gamma results. And of the 200 files that we reviewed, 23 contained a total of 140 positive beta or shallow dose results. What was apparent from this review is that -- let's see, when there were positive beta results, they were not the norm, so it -- from this 200, a very low number of actual bad readings contained a positive dosimetry result.

There was a total of 256 positive photon results for the years in which the positive beta results were located. And let's see, I -- as far as the beta-to-photon ratios that we have and observed in this review, based on the annual exposure dosimetry totals for the year in which the positive beta results were available, a review of 50 annual ratios found 25 to be less than a one-to-one ratio, 13 ratios were between one and two-to-one, and only three of the 50 ratios were equal to or greater than four-to-one beta to gamma. Right now our site profile has an indication that we can use up to a five-to-one beta to gamma

ratio.
Furthermore, there are additional survey documents and rad safe reports that do have measurements, and these that I'm speaking of are particular to the NRDS tests as well, so...
MR. PRESLEY: Okay.
DR. MAURO: Mark, this is John. I -- I have a question. It sounds like that there are two kinds of analyses that we have here to deal with this beta dose. One is a theoretical one where by looking at Hicks tables, if you know -- or given the point in time you're at following a test --
MR. ROLFES: Uh-huh.
DR. MAURO: -- and you have your gamma reading, you could predict what the beta yield would be, and that would be a theoretical -- certainly one very reasonable approach to doing it, probably gives you pretty high estimate.
The other approach is to actually use your measurements that were taken --
MR. ROLFES: Uh-huh.
DR. MAURO: -- and my guess is you'll get substantially different results when you actual use measured data. What -- what approach are

you adopting? That is, for the purpose of reconstructing beta dose, are you going to use -- I be-- are you going to use the actual empirical measurements for the ratios --

MR. ROLFES: In (unintelligible) --

DR. MAURO: -- or are you going to use the theoretical ones based on Hicks?

MR. ROLFES: Empirical data would always outweigh any theoretical calculation that could be done, and I believe we're just investigating the Hicks tables just to -- to see if we're right -- in the right ball park, excuse me. But certainly the recorded data would outweigh any theoretical calculations.

DR. MAURO: I -- I would just caution -- you know, if -- let's say there's a big difference, a substantial difference between the ratios. You may want to check to see wha-- the reliability of the beta measurements, given some of the limitations of beta detection.

MR. ROLFES: Yes, and certainly we could look into that as well, as we previously discussed. And I guess to further elaborate on that, we did have a discussion at the last working group meeting about low energy beta particles.

However, when individuals have a potential for beta exposures, those individuals are likely in anti-contamination clothing plus their own personal clothing. And so any low energy beta emitters that wouldn't have been recorded by a dosimeter's open window would have not penetrated through that individual's --

DR. MAURO: Uh-huh.

MR. ROLFES: -- clothing to irradiate their skin at a depth of seven milligrams per square centimeter. Let's see --

DR. MAURO: By the way, I did notice an -- we believe that in making that determination -- you know, what might penetrate through the clothing, beta -- beta energy and -- and the -- the shielding effect of his clothing, I don't know if this has any play here, but we noticed that in a calculation that was done in OTIB-17 there was an assumption regarding the density -- you know, the grams per centimeter squared --

MR. ROLFES: Uh-huh.

DR. MAURO: -- of clothing, and I think there might have been a six-fold error in that calculation, the reason being there was -- which is being discussed as part of TBD-17, but

if you use that factor, shielding factor -- maybe ought to take another look at that.

MR. ROLFES: Okay. And then also one of the reasons we are looking into the Hicks tables is to determine whether any of these lower energy beta particles were produced. Is that correct, Gene? Is that one of the reasons that we were reviewing the Hicks data, to determine any weak beta emitters?

MR. ROLLINS: That's part of what Richard's looking at -- Richard Griffith is -- that's what he's looking at. I haven't reviewed his results yet. I was more interested in how the refractories could be enriched so I -- yes, but that is part of what he's -- he's reviewing.

MR. ROLFES: Okay.

DR. MAURO: Yeah, if they -- you know, the idea circumstance would be if your empirical measurements are very compatible with the Hicks measurements -- Hicks theoretical relationship, you know you've got a rock solid case. If there is a large difference, then of course you're in that difficult situation of -- and let's say Hicks is more limiting, it becomes the bounding -- you're in a difficult situation

of, you know, demonstrating why you're going to go with the lower ratio for the reasons you gave. I mean in principle the arguments you're making are certainly valid. That is, you're going to get shielding effects. But -- but then you're in that position where you have to make that case. But ideally if the ratios come out equivalent, that would be -- in -- in my opinion, that would put this problem to bed.

MR. PRESLEY: Okay.

DR. ANSPAUGH: But again I think the ratios are not going to come out equivalent because the method that Griffith is using doesn't account for the self-shielding effect of surface roughness, so I think high priority really should go to the empirical data, as Mark mentioned.

DR. MAURO: Okay, thank you. I sta-- I stand corrected.

MR. PRESLEY: All right. Anybody have a problem with 19 then?

MR. CLAWSON: This is just Brad, so --

MR. PRESLEY: Go ahead.

MR. CLAWSON: -- (unintelligible) we come to a conclusion on this. I know -- to me, it seems

like we're still kind of up in the air about it.

MR. PRESLEY: Well, John just agreed.

DR. MAURO: Yeah. I mean I -- my only concern was that if you're not going to use Hicks, you know, that means you may not be as conservative. But as Lynn pointed out, and I -- and I defer to Lynn certainly -- that the empirical data is the -- are the numb-- the data to rely upon and I'm fine with that. It sounds like you're going to come out with a ratio that may be somewhat different than the five-to-one that you've been using before. Is that correct?

MS. MUNN: It sounded lower.

DR. MAURO: You're coming up with a higher or lower value? If -- if I understood correctly, the current guidance says a ratio of -- a beta to gamma ratio of about five-to-one?

MR. ROLFES: Current guidance -- I'm sorry, I didn't know if the question was guided to me, John, I apologize. The current Technical Basis Document has a range of beta-gamma ratios based upon essentially the facts of the case that we are working with and the individual's exposure

potential, and what we have in the site profile has right now a maximum of five-to-one, I believe, beta to gamma ratio. Does answer what you had asked --

DR. MAURO: Well, and -- but I'm hearing that you're revisiting that ratio right now.

MR. ROLFES: Well, we were asked to take a look into -- we did indicate that we were going to look into the Hicks table and we were going to consider the refractory issue about adding refractories back in --

DR. MAURO: Uh-huh.

MR. ROLFES: -- and we had tried to set up the technical call, however we weren't able to do that prior to this call. From what it sounds like, though, the empirical data is the best path forward and would certainly be -- be most robust.

MR. ROLLINS: Mark, this is Gene Rollins, I --

MR. ROLFES: Yes, Gene.

MR. ROLLINS: I have in front of me the results that Richard Griffith sent to me yesterday. This -- this data has not been reviewed. I can only just tell you what I'm looking -- the graph that I'm looking at right now, and it's

basically beta to photon ratios based on the Hicks data --

MR. ROLFES: Okay.

MR. ROLLINS: -- as a function of time after detonation. And it -- it -- at (unintelligible) zero, we're looking at about a ten-to-one beta to gamma. That falls -- after ten days it falls to about two-to-one, and then at 1,000 days after detonation it peaks at what appears to be about 80-to-one, and then at 10,000 days it falls back to about 11-to-one. You can make of that what you will. I think what Dr. Anspaugh said certainly has to be taken into consideration, and I -- and I suspect a lot of this beta in here, although it's not documented what it is or what the energies are, I suspect a lot of this might be low energy beta.

MR. ROLFES: Okay.

MR. ROLLINS: So take that with a grain of salt.

MR. ROLFES: Okay.

MR. PRESLEY: Sounds to me like that's all over the table. Okay, we got a problem -- anybody have a problem with that? I'm going to mark

that closed and -- and if -- if something comes up down the road, then we can -- we can certainly re-evaluate it.

MR. CLAWSON: Well, Bob, this -- this paper's still coming out. Correct?

MR. PRESLEY: Right.

MR. CLAWSON: Okay. Well, I just -- that's fine.

COMMENT TWENTY: NON-USE OF BADGES

MR. PRESLEY: Okay. Go with 20, there appears to have been an internal non-use of badges in some circumstances. And Mark has gone back and looked -- and I'm going to let you go ahead and tell what you've looked at and what you've found on that. I find that data to be very, very informative.

MR. ROLFES: A picture says a 1,000 words.

MR. PRESLEY: You got that right.

DR. MAURO: (Unintelligible) file so you're -- you're looking at that graph now?

MR. ROLFES: Yes, I -- I did just open the attachment that was sent to you in the second e-mail that I passed around.

MR. PRESLEY: Talk about figure 1 first?

MR. ROLFES: Yes, this -- I'm looking at figure

1, and this is the Nevada Test Site claimant exposure by quarter from 1963 through 1966. At the last working group meeting we had mentioned that we were going to go back and take a look into the claimant population to determine whether there were individuals that had a potential to be in a situation where they would need to remove their dosimeter to avoid exceeding an annual limit or a quarterly limit. And what we have done here, if you take a look at this first quarter -- or, excuse me, this first figure here shows the number of individuals that approached the 3,000 millirem limit. And if you take a look, there's approximately two individuals that were in a potential to be exposed to 3,000 millirem in a quarter.

DR. MAURO: I'm sorry, I'm looking at the -- there's a figure here -- I may -- I'm not sure if I'm looking at the same thing you're looking at. It's not -- the file I'm looking at -- it starts off with a -- one of these three-dimensional color pictures.

MR. ROLFES: Correct.

DR. MAURO: Is that what you're looking at

right now?

MR. ROLFES: Yes, that is correct.

DR. MAURO: Oh, okay, so I want to make sure --

MR. ROLFES: If you take a look at the two highest peaks there, there's two peaks that exceed 2,500 --

DR. MAURO: Okay.

MR. ROLFES: -- millirem, and those are the two individuals that I was referring to approaching the 3,000 millirem quarterly limit.

DR. MAURO: Okay.

MR. ROLFES: If you go on to the next figure 2, it goes on and shows that there were three or four individuals that were approaching the five rem annual limit from '63 through '66.

DR. MAURO: Okay.

MR. ROLFES: And we've identified the individual's doses here to basically show you that there were not a large number of individuals that were in a situation where they would have needed to remove their badge to avoid exceeding an annual limit for dose. Let's see, we've also prepared a small write-up as well, and if we have Mel on the line I guess I'd like him to speak. I'm starting to get a

sore throat from speaking here a little bit and my mouth's a little dry so -- actually before we get into that, if you wouldn't mind, Bob, could we take a break --

MR. PRESLEY: Yeah.

MR. ROLFES: -- or sometime in the near future?

MR. PRESLEY: Yeah. No, let's do it right now.

MR. ROLFES: Okay, great.

MR. PRESLEY: Does everybody want to take a five-minute break and we'll start back up at 20 till? You can just mute your phone and we'll not cut anything off.

DR. BRANCHE: Okay, 20 minutes till the hour, Bob?

MR. PRESLEY: Yeah.

DR. BRANCHE: Okay.

MR. CHEW: I'm on the line, Bob, Mark --

MR. ROLFES: Okay, thank you, Mel. I'll be back in about five.

MR. CHEW: Okay.

MR. ROLFES: Thank you.

MR. PRESLEY: Thank you.

(Whereupon, a recess was taken.)

MR. PRESLEY: Ready, Mark?

MR. ROLFES: Okay.

MR. PRESLEY: Discuss this write-up.

MR. ROLFES: Okay. If Mel's available and is there back on the line, I'd like to have him summarize the review that was conducted, if you could, please.

MR. CHEW: Sure. The question -- the comment came is were there any systemic or intentional non-use of badges in some circumstances to avoid approaching or exceeding the occupational dose limits here. (Unintelligible) say this practice might have occurred until the mid-1960s or even extended into the '97 -- the 1970s. During the last meeting when this issue was brought up and was both the -- also both the -- a comment from SC&A and also it addresses one of the comments that came up on the SEC, so I think we're covering both situations here. The -- the question really comes up is that there was some -- there was a worker interviewed that made some allegations or assertions that this may have hap-- happened. NIOSH committed to look into how we would evaluate and analyze information and so we can addre-- properly address this particular question and issue here.

The qua-- the time frame in -- in -- in -- right now is between 1963 to 1967 time -- 1966 time frame. And the reason why after 1966/'67, the dosimeters -- the badge were incorporated into the security badge and also was color-coded and it was incumbent of the security force to assure that the NTS workers were wearing the latest color-coded badges that would represent probably their monthly change on their badge -- on their film badge. So we're talking about a period between 1963 to 1966 where the dosimeters were worn as a separate item on the -- on the clothing or on the person here.

So what we did is that we tried to examine the highest exposed NTS files that we have access to and look how many of the claimants -- how many -- how many of these particular files in -- were inclusive of those dates that we're looking at, 1963 to 1966 again. We came up with about 93 individual files that really represented a good cross-section of not only the workers involved but the radiation technicians and the -- some miners and the tunnel people, so we -- we analyzed the proc--

the distribution of the people -- worker that it -- this is truly representative. And we came up with -- there was about 1,880 datapoints that we looked at, so it was not -- so ev-- every -- many of -- all these workers and by and large who had their film badges changed on a monthly basis, if not more, you know, based on some specific incidents that they were working on, a particular shot or recovery that caused the -- the Reynolds Electric folks to go ahead and change their badge.

And the only -- the only really plausible reason why a large group of workers would misuse their dosimeters is that it would preclude them from -- from working additional radiation -- high radiation areas -- all radiation areas and so therefore potentially lose their potential income here. And at that time, as you've shown on the graphs, the applic-- applicable dose limits were 3 rem per quarter and 5 rem per year. There were no administrative controls at that time in place during that particular time period here. And so only the workers really who had really an

incentive to hide their real true dose and the risk of being disciplined would -- would -- would probably have a reason for going ahead and not wearing their dosimeters here.

Our analysis clearly shows that -- and remember we looked at all these particular claims on a mon-- every time they changed the badge, so when you look at the particular file you can actually even see how often that badge was changed and -- and sometimes it was even more than the month -- on a monthly basis here, but certainly on -- when you look at their annual records you can see that -- that they were -- had their badges changed on a very regular basis here.

So we're looking to see if there was any pattern and also to analyze what the maximum exposures might have occurred during a particular quarter which would give them an incentive to not wear their badges here. So --

MR. PRESLEY: Hey, Mel --

MR. CHEW: Yes?

MR. PRESLEY: Hey, Mel?

MR. CHEW: Yes, sir?

MR. PRESLEY: This is Bob Presley. You all

continue. I have to go make another phone call right here in a second and I'll be right back.

MR. CHEW: Okay. All right, Bob, I'll continue here.

MR. PRESLEY: Thank you.

MR. ROLFES: Go ahead.

MR. CHEW: So what we did is that -- to clearly demonstrate that the -- the -- the -- none of the people -- none of the folks that we examined even come cl-- will come close to exceeding their quarter limit and not (unintelligible) their annual do-- exposures, too. As Mark said, only a few even came close to on a quarter area, but the majority of them actually received very low exposures for that particular monthly change or on an annual basis or on a quarterly basis here.

So the in conclusion, we'd like to propose that the analysis of the data clearly demonstrates that there was not a systemic pattern or any real reasons for the Nevada Test Site people that we looked at to remove their dosimeters to -- in -- in order to continue working in the radiation area. Not to preclude that there may be some exceptions in this particular area, but

there was certainly not a systemic pattern.

MR. ROLFES: And one other thing I think is important to point out, Mel, is that the exposures that these people typically received were received in a very short time period, typically involved with a re-entry that occurred over -- for example, a few hour time period or up to two-day time period sometimes, one or two days, rather than a chronic exposure that a person would continually be exposed -- these -- these are simply acute exposures, so there really wouldn't have been a time for an individual to develop a pattern of improper behavior and do this in a -- a continuing basis.

MR. CHEW: Yeah, let me add to that, Mark. Many occasions -- as you well know, the dates are well-defined. We know what experiments or what tests were conducted. You can certainly see, even on some of the hi-- higher exposure people that the badges were even changed either for one day or two days apart here --

MR. ROLFES: Uh-huh.

MR. CHEW: -- and so that even validates what you were just saying here, Mark.

MR. ROLFES: Okay.
MR. CHEW: Uh-huh.
MR. PRESLEY: This is Bob Presley. I'm back, I'm -- I'm listening.
MR. CHEW: Uh-huh, I'm open to questions here.
MR. CLAWSON: Yeah, Mel, this is Brad Clawson.
MR. CHEW: Hi, Brad.
MR. CLAWSON: Explain to me how -- well, this claimant identifier, did you just use claimants that -- use their doses for this or was this an overall general over the Nevada Test Site?
MR. CHEW: Well, we have -- we had some access problems right now with the records center at the -- at Nevada and so -- however, we were able to certainly look at all the highest exposures, the highest exposure of the 160 from the direct claimant files. So yes, they are from the claimant files.
MR. CLAWSON: Okay.
MS. MUNN: Those are the only ones that we're interested in, in any case.
MR. PRESLEY: That's correct.
DR. MAURO: This is John, I -- I -- I'm going to be a bit of a skeptic, so bear with me a little bit.

MR. CHEW: Sure, John.
DR. MAURO: Now in looking at the data, it looks like you have individuals -- in other words, you -- I see there are about 100 claim-- claimant identifiers -- looking at the very first graph --
MR. CHEW: (Unintelligible)
DR. MAURO: -- and -- and looking at it, what it shows is that no one out of the 100 -- and I believe these may have been the highest exposed individuals out of the population of numbers you looked at?
MR. CHEW: That's correct.
DR. MAURO: No one exceeded their -- the limit. Could -- couldn't someone argue that this is evidence that there was a practice of deliberately avoiding these exposures, especially when you say that the exposures may have occurred acutely? You know -- what I'm getting at is I don't know -- I mean -- please, I guess I feel as though -- I -- I don't -- I see what you've done here, and you're showing that look, we took the highest 100 claimants -- exposures that we -- we were able to find in the records out of I don't know how many

thousands you had mentioned that you looked at, and you plotted the data by quarter for these people, and no one exceeds the quarterly limit of 300 (sic) millirem. And somehow you find that as being compelling evidence that this practice of deliberately leaving their badges let's say back in their locker is -- that this somehow provides evidence that -- that they didn't do that.

MR. SMITH: John --

DR. MAURO: I have a little trouble with the log--

MR. SMITH: John -- John, this is Billy.

DR. MAURO: Yeah.

MR. SMITH: If you look at table 1 --

DR. MAURO: Okay, let me go down to the table.

MR. SMITH: -- I think that's a better --

DR. MAURO: Okay.

MR. SMITH: -- description as to -- rather than looking at the graphs (unintelligible) there and seeing that nobody went over the limit. But if you can look at those --

DR. MAURO: I'm on table 1 right now.

MR. SMITH: Yeah, table 1, if you look at the means, the median and the 95th percentile -- of

course the bottom line just shows the maximums that are shown on those particular plots.

DR. MAURO: Okay. These are quarterly doses, distribution and numb-- okay, I'm looking at it, '60-- 1963, quarter number one.

MR. SMITH: Right.

DR. MAURO: Okay. All right, let's -- let's walk through that.

MR. SMITH: Okay.

DR. MAURO: Yeah, so -- okay, if you're looking at the arithmetic mean, I see the arithmetic mean out of the number of samples here is 131?

MR. SMITH: Right.

DR. MAURO: And the median is zero.

MR. SMITH: Right.

DR. MAURO: Okay, so 50 -- so basically what you're saying, half the people, at least, had no more than --

MR. SMITH: Doses were below zero.

DR. MAURO: Say -- sorry?

MR. CHEW: Let him finish, Billy.

MR. SMITH: Okay, go on.

DR. MAURO: No, no, I just want to read the numbers and see if we're looking at the same thing and -- so what we're saying is that half

-- half of the workers that were in this first column had doses that were below the limits of detection, and the maximum out of all these people was 2 rem in that quarter.

MR. SMITH: Right.

DR. MAURO: Okay, and there -- and there was a 3 rem per quarter limit.

MR. SMITH: Right.

DR. MAURO: By the way, these numbers are very consistent with the graph.

MR. SMITH: Right.

DR. MAURO: Okay. Now I guess -- now -- now that we're -- understand that we're -- we're looking at the same column, now you're saying that somehow this is evidence that there was no practice or systemic practice of -- of deliberately leaving let's say badges in -- in -- in the -- and I gue-- help me out with this, I -- I want to -- I want to be convinced but I haven't -- haven't yet.

MR. SMITH: Okay, look at the -- look at the 95th percentile column as you go across by year, as an example. You know, you could look at every quarter there and --

DR. MAURO: Yeah.

MR. SMITH: -- if you start with '63, you have 573, 730, 182 and 104.

DR. MAURO: Uh-huh.

MR. SMITH: So that simply says of course that the doses that fall in that particular percentile category were significantly less than 3 rem a quarter numbers. I mean they don't even approach the 3 rem per quarter number.

DR. MAURO: Right, right.

MR. CHEW: John, I -- we -- we need to have a -- an agreement that there -- there has to be a reason for the people to do that. Okay? And -- and -- and I think we addressed that as that the reason is that the potentially would have been received greater than the quarter exposure -- quarterly limit exposure and would take them out of potentially working and potentially loss of income. So I think we're fundamentally -- have addressed there's -- there's a reason for why the people want to do that.

The next -- there's a level of detail that is not shown in this table that we actually analyzed was when we actually look at the individual files here. You could just see on a

given year or an -- on a given -- I'm sorry, on a given individual, on a year, you could see that that persons have the badges changed even on a monthly basis, so you see numbers that are on a monthly basis that -- and then adds up to the quarterly exposure, too. So the monthly one gives you really a -- a indication that if a person says, you know, gee, I just got 50 this month and another 50 this month and another 50 this month here, you know, what -- what is the real reason for not -- for going over -- be concerned that they're going to go over the quarterly limit here. Okay? And so I think the fundamental thing we have to come to agreement is that we -- we're trying to show is that there was fundamentally not a real purpose and a reason for why -- systemically why that they would need to do this.

MS. OWENS: This is Kathleen from Senator Reid's office. Can I perhaps add something here?

MR. CHEW: Sure.

MS. OWENS: You're asking for reasons, you know, and I believe this is the only issue that's being looked at, but I have heard from

many workers who also didn't wear their badges for fear of damaging them in terms of, you know, trades workers. I'll give you one example, one of the petitioners, for example, he would get sparks on it and so, you know, they didn't want to damage the badges, supervisors looked down upon this in terms of having to do more paperwork. Has this been looked at, and I've heard this from many people, not just perhaps one person.

MR. CHEW: Billy, I mean you might (unintelligible) since you were part of the dosimetry on (unintelligible) maybe address that.

MR. SMITH: Kathleen, I don't -- I'm not aware of people taking off their badges for any reason, and -- and I certainly hadn't heard of anybody taking off their badge for fear of damaging them.

MS. OWENS: I -- I guess this is maybe more particular for the SEC, but I -- one of the affidavits in the SEC petition quite clearly states that.

DR. MAURO: Yeah, this is John. I -- I have to second that. The reason I am paying a lot of

attention to this particular issue, it is -- it certainly has applicability to the dose -- the site profile, but it is probably the most important problem or issue associated with the SEC. There are -- there are ten affidavits that were filed and the -- the affidavits are very compelling that there was in fact some widespread problems, and in fact the very reason that we just heard, beside approaching a max -- it sounds like even there was a -- more reason was that -- that the -- they get -- there's a problem in terms of the -- this -- the -- they get dirty and they left -- and there was a -- and it -- it sound like from looking at the affidavits, quite frankly just trying to look -- read the story told, and it sure sounds like there was a lot of that going on, leaving it behind. And if that one worker, and I have to go look again, and this may be another way to get a hook on this, claimed that he routinely left his badge behind, but he did wear a pocket ionization chamber, and in -- and he was -- and in fact he talked about a particular circumstance where his pocket ionization chamber read very high, I think it

was 5 rem, and -- but -- but he left his badge behind. So the -- this seems to be -- one of the things I would want to do of course is see, you know, if there's any way to track -- say okay, the -- here's -- here's a bunch of pocket ionization chamber readings that were -- that were read out -- I don't -- I don't know if these are in the records -- I mean this would be almost like the prima facie evidence of yes or no whether this was going on if -- if there is a record of the PIC readings and -- and if the same -- in that month let's say you find that yeah, this person has a record in the log somewhere that says the -- the -- the pocket ionization chamber read whatever numbers are in -- are in the record, we -- recognizing that pocket ionization chambers are not as -- anywhere near as reliable as a film badge, but then looking at the film badge records and if you see for that month it is reading of zero and -- and this is basically what's being claimed in some of these SEC affidavits, that would -- you know, for -- if that's -- if we see that -- I'm looking at a way -- you see, this is an indirect way, and I understand your

argument, the table 1 that we're looking at. But then I read that -- I have to say, after reading that petition I said hmm, oh, my goodness, I would sure like to find out whether or not for this particular person that ga-- gave this particular claim in his affidavit, whether or not his -- his actual dose in that month when -- you know, was re-- recorded as zero, but his PIC he claims has recor-- recorded at least, on one day, five -- five R, there may be -- that may be a direct way -- does anyone know on the phone whether or not pocket ionization handwritten logs are -- are maintained somewhere --

MR. SMITH: This is Billy, John.

DR. MAURO: Yes?

MR. SMITH: Yes.

DR. MAURO: Yes.

MR. SMITH: There were logs maintained of any PIC readings that people exiting an area -- they were recorded on logs and those records would be maintained at the records center.

THE COURT REPORTER: Excuse me, was that Mr. Smith?

MR. SMITH: Yes.

THE COURT REPORTER: Okay, I just wanted to make sure. Thank you.
MR. SMITH: Who was that?
THE COURT REPORTER: This is the court reporter.
MR. SMITH: Oh, I'm sorry.
DR. ROESSLER: Who was the person who talked before that?
DR. MAURO: John Mauro.
DR. ROESSLER: Okay, but there was somebody else I think that --
MR. ROLFES: Billy and Mel Chew.
DR. ROESSLER: But it was probably Mel answering the PIC question.
MR. SMITH: No, that was me, Billy.
MR. ROLFES: That was Billy Smith.
DR. ROESSLER: Billy, okay, thanks.
MR. SMITH: Okay. Yes, we did maintain logs of people exiting areas where they wore PICs, and those records are available. Haven't looked at them from the respect -- from the perspective that John just mentioned. That would be an interesting view. But one of the things that, you know, you need to recognize is that when these people worked in these radiological areas

where there was potential exposures and they had to wear PICs in -- associated with those dosimeters, that was one of the methods we used to determine whether or not they would need to get dosimeters changed, badges changed, on a more frequent basis than monthly.

MR. ROLFES: In addition -- yeah, the real time monitoring is documented by one of the health physicists that we spoke with. Real time monitoring was in fact done for individuals that were in a position to be exposed to high dose rates -- for example, on re-entries. So an individual working in a high dose rate area would have had radio communications with someone who was observing his recorded dose or his exposure on a real time basis.

MR. SMITH: The other thing that took place is while these people were working in those areas WSI security had a very, very high presence in these areas and one of the reasons why it -- it -- it doesn't seem reasonable to me that people would be allowed to take off their badges is that because, you know, if they did, then it would have been a security violation and they would not have been able to work in them.

MR. CHEW: Billy --
MR. SMITH: Yes.
MR. CHEW: -- let me -- I don't want to put words in your mouth, but maybe you can answer this question here. Let's focus in on the time frame, the '63 to '66 --
MR. SMITH: Okay, in the --
MR. CHEW: -- 'cause I think '67 afterward --
MR. SMITH: The dosimeter and the security credentials were separate at that time.
MR. CHEW: At that time there was clearly some of the REECo rad safe staff present when -- you know, in high radiation areas and people potentially wearing pocket dosimeters 'cause that's who issued them. And so were the rad safe monitors, the RCTs, part of their responsibility to assure that they were also -- that people were wearing those --
MR. SMITH: Of course.
MR. CHEW: -- film badges in addition to the PICs, too?
MR. SMITH: Yes.
MR. CHEW: Okay. I was hoping you would say that.
DR. MAURO: Now I don't know --

MR. CLAWSON: Let me ask, John, I've got a question. You're telling me of course you've got a check-off list that you checked each one of those had a badge. Let me ask you this. Did you check to make sure they had any kind of crystals in them --

DR. MAURO: Oh, I didn't check --

MR. CLAWSON: -- or anything else like that?

DR. MAURO: Oh, I didn't go back to his -- no, this is basically a que-- see, I know -- there are these af-- ten affidavits. I didn't go back to their dose reconstructions or their records. We didn't do any of that. We -- we have not been authorized to do that. All we've been authorized to do is to review the affidavits and the information that's available to us as part of the SEC review. And when I see a person that claims that he left his badge in the locker room and went in because of the concerns that were mentioned earlier, getting it dirty, the -- the sparks, and also high exposures -- potential, but did report that he had this very high PIC reading on his pocket ionization chamber, one -- one thing I would do immediately but which I haven't done is simply

say okay, any way we can zero in on the date -- the date when that PIC was -- when he claims that he received that high exposure reading, and then go and look at his film badge reading for that month. And if he got -- if he saw 5 rem or R on his pocket ionization chamber and there's a zero in his -- his data for his film badge reading for that month, something doesn't look right and maybe his claim is valid. Maybe his --

MR. CHEW: And we have to be -- caution, too, John, as you well know, you know, pocket ionization chambers are susceptible to doses -- I mean to -- to discharges that potentially give false readings --

DR. MAURO: And I --

MR. CHEW: -- (unintelligible) factor that in, too.

DR. MAURO: And I agree with that. Now the things is -- now if there are -- let's say it turns out -- that's why I asked the opening question was if there's a record maintained of the pocket ionization chamber readings, and let's say we went in and randomly grabbed ten of them out of -- just randomly grabbed --

don't even look at anything but just randomly grab some positive readings, and let's say just take ten of them, then go back and say okay, and let -- these are positive readings now so you're going to see some number above zero. Then go back -- just go grab these same people's month-- monthly film badge readout, and if in all cases they read zero and -- while the pocket ionization chambers that you picked for these people read something positive, I would -- I would -- then -- and then I would say you know something, these folks have a -- have a -- make an as-- sounds like there's a legitimate claim here.

MR. CHEW: Sure, it doesn't add up, yeah.

DR. MAURO: Yeah, it doesn't add up --

MR. CHEW: (Unintelligible) I agree.

DR. MAURO: -- and -- and then they say -- but if you look at ten and in all cases the film badge gave a positive reading -- may not be exactly the same as the pocket ionization chamber --

MR. CHEW: Sure.

DR. MAURO: -- reading is, you wouldn't expect it to be, but you would like -- you expect that

if you did get a positive on the pocket ionization chamber, you would get a positive on the -- on the film badge, and -- and if you see that and in all ten you do get a positive positive, I would say hmm, you know, maybe this wasn't a widespread practice if it existed. So to me, that goes -- the only reason I'm -- I'm bringing this up is that this is the essence of the SEC petition, and -- and this -- and right now the -- this type of analysis, though it goes towards that concern, I -- I would say if what I just described sounds reasonable to everybody on the phone, this is certainly something that might be a good thing to do. Not SC&A, for NIOSH to do, to put this problem and answer this question because the affidavits -- these folks that wrote those affidavits are very detailed and they're convinced that this was a widespread practice, so they're coming -- their position -- these workers are -- are -- definitely believe that there was this widespread practice. I remember [Name redacted was one time spoken to about this. Unfortunately he has passed on. He also said it was a widespread practice, and I think we --

we have an obligation to let -- let's really put this one to bed. And if we can do that by looking at the PIC data and -- and almost like a blind test to see what the film badge compared to the PIC, that might be one way to get a real handle on this and put this issue to bed the right way.

MR. CHEW: John, I -- this is Mel. I like what you're saying. Let me propose this, that NIOSH and the ORAU team go back and come up with a spot so we can think this out and so we can really address this because you -- you clearly say that this is a very important issue here and so we'll come up with some method -- methodology to try to address this issue adequately, taking into consideration what you have suggested here.

MR. ROLFES: Before -- before we agree on anything -- this is Mark -- and I wanted to ask Billy a question. For an individual that would have damaged his dosimeter or his film badge associated with, you know, welding or getting sparks on the film badge, burning a hole in it, would something like that, if that occurred, would that be documented in the individual's

file?

MR. SMITH: Yes.

MR. ROLFES: Okay. So if we had documentation then of an individual that had damaged his badge, if we had that indication and he was the same one that was making the statement that he was told -- or asked to remove his dosimeter, then that would certainly be a number one identifier that would, you know, attract our attention to such an issue.

MR. SMITH: Yes, that would be --

MR. ROLFES: And then -- and then in that case it would give us a path forward for assigning a dose to that individual.

MR. SMITH: I have a comment to John relative to the petition that you were talking about, not the -- not the overall SEC petition but the claimant statement that he got 5 --

DR. MAURO: R.

MR. SMITH: -- R on his badge and he was a welder. I mean as a health physicist, does that make sense that a guy would be welding in an area, creating vapors in a radiological area and that -- that there was not any other people around doing the proper air monitoring and

personnel monitoring?

DR. MAURO: There -- there are a lot of reasons not to believe that statement, that he received 5 R. In other words, I'm not disagreeing that there are reasons -- but then again, the statement is made in an affidavit and it's a re-- and it's a -- a recurring issue. I just used that as one example of one that -- there are nine others that have stories that are attested to, and then of course we have the statements made by Mr. Brady that this was a widespread practice, and I -- and I think that we have -- I think that if there's another way to come at this problem that might be a little bit more direct in order to really put this thing to bed, I think we should do it. I'm sorry to be so -- I mean I'm -- I -- I feel as if the data analysis that was just done goes toward that, but there are other things that could be done -- probably fairly expeditiously, unless I'm wrong -- that could really answer this question to the satisfaction of everyone, including the folks -- you know -- you know, who are con-- concerned this was a widespread issue. It may turn out that it's not -- was

not a widespread issue and such an analysis might actually show that. So I'm not -- I'm not saying that I necessarily believe the person actually experienced 5 R any -- in one -- in one day. I don't know if that's -- if that's real. But I think that -- that this -- this recurring theme needs to be more directly addressed and I -- I'm only saying this because I'm right -- involved up to my eyeballs in the NTS SEC petition review.

Along these same lines --

MS. MUNN: Which -- which period? Which time period, John?

DR. MAURO: Pardon me? Who --

MS. MUNN: Which time period?

DR. MAURO: Oh, this is -- this is post-'62. This is -- this is during -- this is -- now I don't know for this particular worker what year that was, but it -- this is all when the below-ground testing was -- not during the above-ground, so we're talking post-'62. That's -- and the reason that's the case is because that's the SEC petition, it's for post-1962 --

MS. MUNN: Right, right.

DR. MAURO: -- and so this worker and the other

nine affidavits all go toward that time period. Now what the particular year is when this occurred, whether it occurred during the '63 to '67 period or occurred a later period, I don't know.

MS. MUNN: But it was post the existing SEC, that -- that was the only question.

DR. MAURO: Ye-- yes, it was -- the existing -- not the old -- not the one that's been awarded but this is the new one.

MS. MUNN: Uh-huh.

DR. MAURO: Now there's one more thing that I think is important that I think is a source to get a handle on this, and bear with me. In the S-- in the SEC there is -- the evaluation report -- the evaluation report explicitly tries to address this issue. And what it does is it has a table in it, and it says okay, we looked at 1,200 CATIs for -- for -- taken -- you know, CATI reports taken from claims, and we also, independent of that -- this is NIOSH's report -- said that we interviewed I think it was 14 or 15 people.

MR. ROLFES: Yes, that's correct.

DR. MAURO: Right. And the outcome of that --

and this is really a question. The outcome of that was you fou-- you observed thir-- you got 13 hits, namely -- and what I mean by hits is I think the number was 13 individuals said yes, we did leave our film badges behind at -- so -- and the argument was made that well, 13 out of on the order of 1,200 shows that, if it did occur, it was very rare.

Now my -- so I think the idea that that was done, that phone calls were made -- other words, you looked at the CATIs and that you also did separate telephone calls to -- I believe it was 14 or 15 people specifically asking that question in the phone calls -- not in the CATI. Remember, the CATI does not ask that question. Certainly it might come out in -- during the CATI interview, but there's no question in the CATI that says did you, you know, leave your badge behind. But -- but so they actually -- NIOSH actually called up 15 people or 14 people, and the outcome, though, was 13 hits.

My question is that -- did those 13 hits occur in the -- did most of those hits occur in the results of looking at the CATI, or did a

significant number of those hits occur as a result of the 15 people that were called up. Right now I think that, you know, you read that and you say we got 13 hits, but if the 13 hits came from the 14 or 15 people that were called, that changes the complexion --

MR. ROLFES: Sure --

DR. MAURO: -- of (unintelligible) considerably.

MR. ROLFES: -- sure, certainly, and I'd be happy to provide that information to you. And in order to answer that question, none of the 15 individuals that interviewed -- that we interviewed said that they had defeated the badging or had directly seen anyone do this.

DR. MAURO: Okay, that's important. We didn't --

MR. ROLFES: They were --

DR. MAURO: -- I appreciate that information because that was our first concern. We'd like to know where -- where are they -- so the hits occurred -- something that emerged from the 1,200 CATI interviews.

MR. ROLFES: There were two people that had reported that they had heard third-hand that

this was done on site, but none of the 15 had direct knowledge of this occurrence. So these are second- and third-hand reports of -- of this occurrence.

DR. MAURO: Well, I mean just from a statistical point of view, I am encouraged that out of the 14 or 15 people that I assume you randomly called, you got zero hits. If there was a widespread practice, you know, one would expect more -- you know, at least one or two hits, but I'm glad you gave me that information. I didn't know that. See, that's the kind of information that I see that goes directly towards this issue as oppo-- you know, and is very, very helpful in helping to come to grips with this, not only for the site profile but also for the SEC.

MR. PRESLEY: Okay, are there any more questions?

MS. MUNN: This is really a thorny issue, and --

MR. PRESLEY: This is -- this is something that is going to have to be -- as far as I'm concerned, going to have to be done on a -- almost on a case-by-case basis.

MS. MUNN: Well, you know, it's the -- I -- by the time the 1960s rolled around, people who worked on these sites were not babes in the woods. No one that I knew during the 1960s was unaware of the potential involved in radiation exposure. It was a well known, well documented, quite reasonably understood phenomenon. And the reason for badging would have been obvious to anyone. Not only that, it was not a period of deprivation in the United States. It isn't as though anyone working on -- out in the middle of the Nevada desert in the extreme hot, extreme cold, terrible conditions couldn't have found a job somewhere else. It's -- in order for this kind of thing to have occurred systemically, it boggles the mind as to how many individuals would have had to be complicit in having it happen. You would have to have the worker. You would have to have the worker's supervisor. You would have to have the security and health physics people. And you would have to have all coworkers.

DR. MAKHIJANI: This is Arjun. I'm back.

MR. PRESLEY: Thank you, Arjun.

MS. MUNN: It just -- well, the suggestions

that have been made are good ones. I just could not keep making that observation. It seems very difficult, but certainly if we can track it to ground and it can be done with a relative short period of time, then certainly in the context of the SEC that needs to happen. But in the interim, thank you to those of you who have put together the information that we have. It's most informative.

MR. CLAWSON: And Wanda -- this is Brad -- and to your comments, you're talking back in these days -- and I can tell you today that we're still fighting with these issues. And as far as the security badges go and so forth like that, my TLD is different than my security badge. There's many, many different things that push people into this. And I can sit right now -- I have a new work force that is coming in that actually scoffs at me and laughs about some of our contamination issues and radiation issues because they -- they don't believe them. There's -- there's a lot of issues that play into this, so don't think that because of the issues that have arisen because of these petitions and everything else like

that that this problem has stopped, because it still happens now.

MS. MUNN: Hmm, I'm (unintelligible) --

MR. SMITH: This is Billy Smith. One -- one -- one fact that -- that stands out to me over the period of operation of the Nevada Test Site through the present, over a million individual dosimeters have been issued, and less than one percent of that number had any positive gamma dose on them at all.

MS. MUNN: Uh-huh.

MR. ROLFES: That's very helpful to know, Billy. That's --

MR. PRESLEY: I appreciate that, Billy, very much.

MR. CLAWSON: You're -- you're telling me one million badges and you've only got one percent that got any kind of dose?

MR. SMITH: Less than one perc-- less than one percent received any type of gam-- of -- of radiation exposure.

MR. ROLFES: That certainly does make sense based on the limited number of exposures that occurred at the Site. Once again, this is not a production facility where there's a

continuous exposure potential, but rather it's -- it's an acute exposure potential associated with and shortly following after a test. And once again, as we had mentioned before in the analysis that was completed, most of these exposures that we're seeing were received in, for example, an acute manner in one- or two-day time period. So that -- that really does make sense to me from -- you know, from a knowledge of the operations.

DR. MAKHIJANI: But by the same token then, Mark, you know, a global analysis -- a global analysis of badges in the way that you present it rather than -- I had thought that there was going to be an analysis of a particular group of workers in a particular -- in the -- in -- in -- in that period of time, which was the tunnel re-entry workers rather than all of them. I haven't had a chance to study what you sent, but I thought you -- you essentially put all the badges together, which -- which throws in the non-testing periods and the testing periods and the workers who were in the forward areas and those who were not in the forward areas.

MR. ROLFES: No, we --
DR. MAKHIJANI: That's what I understood Jim Neton to say in the last working group meeting is that you would look at the workers who were in the forward areas.
MR. ROLFES: What we have here was the time period of 1963 through 1966 --
DR. MAKHIJANI: Right.
MR. ROLFES: -- and it was 160 of the highest exposed claimants that we have from Nevada Test Site; 94 of those 160 were within the 1963 to 1966 time period, so those are the individuals that we focused on.
DR. MAKHIJANI: Yeah, yeah, but that's different than what I'd thought Jim Neton was proposing is to look at -- because this thing has really mostly arisen, at least in terms of the testimony that has been given, apart from the atmospheric testing period which -- which to some extent is moot because of the SEC -- is -- is the tunnel re-entry workers. This is -- this has arisen both in the testimony that's been presented before the Board, some documentary evidence and so on in -- in that context. And if I remember what Jim Neton had

proposed is what you were going to do is to look at that group of workers to see if -- if there was an issue with -- with their records, their CATIs, their affidavits, their dosimetry, and I don't know exactly -- I don't know that a -- a -- a plan of research was set forth at the last working group meeting, but the group of workers had been defined.

MR. ROLFES: Well, I feel that --

DR. MAKHIJANI: Not (unintelligible).

MR. ROLFES: I really can't think of any other exposure scenario other than -- you know, the -- the highest exposed individuals would have been captured in this -- in this study that we have done.

DR. MAKHIJANI: You're -- you're talking about the highest recorded badges. We're not talking about the highest recorded badges, which is the data that you've presented. What -- what we were talking about is to look at what might be a pattern -- I mean a worker might leave their badge off entirely if they anticipate a high exposure 'cause they don't want to be sent back. I mean I -- I had -- at least this was my understanding and -- and -- that -- that

NIOSH was going to look at a group of workers, not at a group of high exposed claimants but at a group of tunnel workers and look at their records.

MR. ROLFES: Well, once again, this highest exposed group is comprised of several people who were involved in tunnel re-entry.

DR. MAURO: Arjun, I -- during the disc-- what -- during your absence --

DR. MAKHIJANI: Yeah, I'm sorry that I --

DR. MAURO: Yeah, it's okay, but --

MR. CLAWSON: This is -- this is Brad. I hate to -- I -- I've got some -- I've got a lot of people waiting on me to do a job. I didn't think that this was going to take this long. I have got to -- I've got to step off right now. I've got some work that has to be done. I apologize, but I've got several people waiting on me, so Bob, I apologize but I've got to -- I've got to stop right now and go take care of some work right now.

MR. PRESLEY: Okay.

MR. CLAWSON: I apologize.

MR. PRESLEY: I understand.

MR. CLAWSON: Okay.

MR. PRESLEY: We've got about an hour before I've got to go.

MR. CLAWSON: Okay, we'll see you later.

MR. PRESLEY: Now.

MR. ROLFES: John, I think Arjun came back in --

DR. MAURO: Yeah.

MR. ROLFES: -- after your discussion, if you want to --

DR. MAURO: I just wanted to bring -- this is something I want to put out for just consideration. It's an idea that I came up with. In reading the affidavits -- and Arjun, I just mentioned this -- this be-- before you came on -- that we have an individual who turns out wore a pocket ionization chamber, and I found out that -- that the -- this is -- a lot of folks wore pocket ionization chambers, and there are records of what their readings are from the pocket ionization chambers. And in theory you can go back and randomly sample all of the positive readings and maybe -- from -- that -- where there are pocket ionization chamber readings, and they're in the records, and then go back to that person's film badge

record history and see if that month he had a zero, the month where the pocket ionization chamber read something positive, and see if the -- that same very month he has a zero on his film badge reading. That would -- and if that happens, and it happens a lot, well, it sounds like there's something fishy going on. If it turns out that whenever you get a -- a positive pocket ionization chamber reading, you get -- you more or less -- or out of the let's say ten, 20, 30 samples, you also get a positive film badge reading, it's not going to be the same, it seems to me that kind of analysis -- unless I'm missing something -- would really put this issue to bed, one way or the other.

MR. PRESLEY: This is Bob Presley. We're going to beat this one to death. I'm going to ask Mark if he would go back -- Mark, how long is it going to take to do something like there to where that you can get your hands on those pocket dosimetry -- those things and then look and see what the -- if it corresponds in any way to the badge readings.

MR. ROLFES: Well, we are trying to be -- you know, we are trying to work within a set amount

of time and trying to provide responses to claimants in a timely manner. This is something -- if we're referring to a million film badge results, I certainly expect there's at least that many pocket ioniza-- ionization chamber results.

MS. MUNN: I think what we're talking about is a random sample of pocket ionization results that can be correlated to the same individual's film badge for that period, and I heard the number suggested 20?

DR. MAURO: And that -- this is a question I guess a statistician -- you know, what kind of sense of a power we're looking for, I don't know. I'm just saying that you only nee-- you don't need that many, and if you get -- you know, if you could randomly select ten, 20 or whatever number that is deemed appropriate of -- of the positive, you start with the -- you want to get positive readings of pocket ionization chambers, and these would just be for a given day, and then -- and you got a positive reading. Then you go back to the -- for that person, that -- the month in which that day got that reading and see if he got a

positive reading, or did he get a zero.

MR. CHEW: I agree with you, John, I think the first -- first order of business to see if we can retrieve the records of the pocket ionization chambers and look at the positive ones. I -- I think that's the right approach here, just talking about how we're going to go forth (unintelligible).

MR. PRESLEY: Would we want to look at them random, or would we want to pull say 20 high doses and look and see if -- if you know you've got a positive high, then there should be a -- at least something on that film badge.

DR. MAURO: Yeah.

MR. PRESLEY: Now if we do that and it's on 20 of those film badges, then I'd say we don't have a problem. If you look at 20 and say okay, ten of these pocket ionization chambers have a high reading but their badges say no reading, then yeah, we've got a problem.

MR. ZLOTNICKI: This is Joe Zlotnicki with SC&A. I've got a question on this and that is is there any indication that the workers in general in these affidavits say they didn't wear their film badge; they say they did,

however, wear their PIC, or were they likely to leave both of them off?

DR. MAURO: I -- I brought this up, Joe, because there was one affidavit where this was the claim made by the worker, that he had his PIC, he got a very high reading on his PIC, but he left his film badge behind.

MR. ZLOTNICKI: Yeah, I heard -- I heard you say that, but --

DR. MAURO: Oh, okay.

MR. ZLOTNICKI: -- I'm wondering in general --

DR. MAURO: Oh.

MR. ZLOTNICKI: -- in these other affidavits if people are claiming that they still wore their PIC and that that dose got recorded. It would seem if people were leaving their film badge off and wearing a PIC and getting a result, they were laying themselves open to be sort of discovered.

MR. PRESLEY: That's exactly --

MR. ZLOTNICKI: So I'm wondering if they would leave all dosimetry off if they're intending to leave any off deliberately.

MR. ROLFES: Well, this is Mark, and for this particular individual, what might be best

helpful for us in directly analyzing whether this situation occurred and if any significance -- any significant dose was received by the individual, maybe we could get -- you know, maybe we could speak with him and get authorization to retrieve his records and take a look at the specific, you know, time period that this occurred and also take a look at what kind of radiation exposure environment this individual was in. That might give us our most straightforward answer.

DR. MAURO: I agree, we should start -- well, you folks should start with the affida-- the people who claim -- who made the affidavits and -- and it sort of -- you know, convince yourself that gee, this has really happened.

MR. PRESLEY: I've got no problems with that. This is Bob Presley. Wanda, what would you agree?

(No responses)

Gen?

DR. ROESSLER: I think if the information is available, that's the very first place to start.

MR. PRESLEY: Okay.

MR. SCHOFIELD: Yeah, I -- I agree with that, too.

MR. PRESLEY: Okay.

MS. MUNN: (Unintelligible) a good idea, John. I hope it doesn't take us down an unproductive path.

DR. MAURO: Well, you know what it is is -- in reality is this is more an SEC issue than it is -- I mean the -- the immediacy of this is apparent. It is the heart and soul of the issue. And the fact that we're engaging it here in the site profile I have to -- I -- I apologize for bringing it up, but it's so -- so fundamental that I -- I -- you know, I couldn't help myself.

MR. PRESLEY: Let me ask you something -- this is Bob Presley. Did we not talk about setting a working group up to look at this problem? I don't think we ever did; I know we talked about it. But -- because this is such a widespread problem --

MS. MUNN: Well, it recurs on every site.

MR. PRESLEY: -- it recur-- recurs at every site.

MR. ROLFES: I know that it was evaluated in

detail for the Rocky Flats site as well, and I know that it's come up with Nevada Test Site and other sites as well, so --

DR. MAURO: Yeah, we never -- I've got to say that the only reason I -- the idea came about the PIC, I don't think we ever talked about the -- that the -- the pocket ionization chambers may be the ultimate solution. I'm not sure if it is. May turn out that it's not going to work. You know, they -- the rea-- you know, and -- but it seems to be at least an idea that might give us a handle on one of the most difficult problems we've been trying to deal with.

MR. ROLFES: Uh-huh.

MR. SCHOFIELD: Right, Nevada has things -- two things, one, the fact that they did actually record these PIC values, which is something that I -- I can say from personal experience they did not do in Los Alamos. Plus, the film badge and your badge were one and the same. They were --

MR. SMITH: Not during this particular time period.

MR. SCHOFIELD: Not during this particular time

period, okay.

MR. SMITH: Right.

MR. ROLFES: During the '63 through '66 time period. However, following 1966 they were one and the same.

MR. SCHOFIELD: Oh, okay.

MR. SMITH: Right.

MR. PRESLEY: Yeah. Okay, let's leave this open, and Mark, the only thing that I know to do -- 'cause we can talk about this for the next week -- is if we decide that we've got to have our meeting on the night of the 7th, let Mark give us an update on what's happened on this.

MS. MUNN: That sure would be helpful to have.

MR. ROLFES: I guess -- I guess a little clarification now as well, you know. If we have indication that one individual did this and it occurred, it becomes a dose reconstruction specific to his claim. What we've done for the site profile review is evaluated, in our entire claimant population, whether this in fact occurred. And for the site profile issue we have a methodology to address this and assign a dose based on the

relevant facts of the case and documentation in our site profile, which we did agree within -- excuse me, that the Board did agree -- the Board did agree with, I believe. We incorporated -- remember we had discussed about assigning a potential unmonitored dose. For example, if an individual was working in a high radiation area for three quarters and then suddenly had a zero reported for the fourth quarter, we did propose using a methodology based on the individual's own dosimetry records to interpolate a potential radiation dose, or even assign the highest recorded dose from any quarter of that year to the quarter where the individual had a zero dose and indicated that he had removed his dosimeter or hid his dosimeter.

MR. PRESLEY: Uh-huh.

MR. ROLFES: So there is a dose reconstruction methodology that exists, and that is the focus of the site profile review.

This is also something that was considered for the SEC evaluation as well, which is a separate issue at this point, so...

DR. ROESSLER: I think that's a separate issue,

but since we've spent a lot of time on it today and since we know that this is going to be an area that comes up and up again, I like Bob's idea of a workgroup on this particular issue, and I don't -- I hope we don't lose that thought. That should come up at the Board meeting, I think, in --

MR. ROLFES: Okay.

DR. ROESSLER: -- Las Vegas.

MR. ROLFES: All right. All right.

MR. SMITH: Mark, this is Billy.

MR. ROLFES: Yes, Billy.

MR. SMITH: You may want to inform the Board of the problems that I encountered relative to trying to retrieve some of the --

MR. ROLFES: Yes.

MR. SMITH: -- (unintelligible) data.

MR. ROLFES: Yes.

MR. SMITH: I don't know how that's going to be resolved between now and the January meeting, so --

MR. ROLFES: Yeah, very true, Billy. NIOSH isn't the only one with funding problems, and DOE is also, you know, under a tight budget constraint right now as well. To access

individuals' records it can get into quite a large amount of time and money and man hours that go into these studies. These -- these are not simple record retrievals. These take lots of time. And if we're talking about going through a lot of data, it -- it's not something that's going to be addressed in a very -- I don't foresee it being, you know, done in a very timely manner. We'd certainly make any arrangements we could to try to -- you know, to try to do it in a timely manner, but I -- I did want to make the Advisory Board aware of that, or the working group aware of that, so...

MR. PRESLEY: I'm very much --

MS. MUNN: (Unintelligible)

MR. PRESLEY: I'm very much aware of that.

MS. MUNN: We certainly do hope we're not talking about a significant sorting of data. If it's not -- if it's available, that's one thing. If it's -- if it's not available, then that's an entirely different issue.

MR. SMITH: Wanda, this is Billy. The data is available. One of the main storage systems that they use for these records -- well, Nevada brought all of the records back from the

federal archives and put them in a repository here --

MS. MUNN: Right, right, thank goodness.

MR. SMITH: -- and most of them are stored on -- on microfilm, and you can go in by some microfilm index number and -- and -- and find most of the things that you are looking for. Then the staff over there -- DOE staff over there have to go over and sort through these things and sort out the Privacy Act stuff that's associated with it so when they present it to us it doesn't have all the stuff other then what we --

MS. MUNN: All the other identifiers, yeah.

MR. SMITH: Yes. So -- and their staff has recently been reduced -- I -- I was trying to get some information from Martha DeMarre within the last few weeks and she just couldn't support me because of their --

MS. MUNN: (Unintelligible)

MR. SMITH: -- ongoing mission and -- and she does not have the resources, and I'm not allowed to go into their particular database because I don't have the permissions to get -- to use their databases.

MS. MUNN: Right.

DR. ROESSLER: I think that because this is really a bigger issue and there's -- there are a lot of problems like time and budget, it needs to be done on a very systematic way, not just somebody has an idea, we follow through on it and then maybe that's not considered the very best way to have approached it. Again, I just want to support the idea of a working group on this particular issue.

MR. PRESLEY: Let me ask something. Can we go ahead and for this site profile go ahead and say that we support, as a working group, the means of doing this on this site profile, but we recommend that the Board ask that a working group be put together to study this as a complex-wide problem?

MR. SCHOFIELD: Bob, I'll back that. I'll second that.

MS. MUNN: Sounds reasonable to me.

MR. CHEW: Mark?

MR. ROLFES: Yes.

MR. CHEW: This is Mel. I think that -- I think maybe it's best for us to -- the ORAU team and you and NIOSH, to -- let's get

together and think about this and how to approach -- to answer this particular one for the site profile here before we make any commitment you said (unintelligible) with an approach that we can try to address this thing in a timely manner.

MR. PRESLEY: Can -- can we talk about this then on September (sic) the 7th and come up with -- if we can -- if we can close this issue out for this SEC, I'm sorry, for this site profile, and then make the recommendation that the Board study this for a -- have a study group look at this for a -- as a -- not a site --

DR. ROESSLER: Global.

MR. PRESLEY: -- global problem, 'cause that's what we talked about before. I remember -- hey, Lew, you still on there? Lew may still have the list of what we talked about but I'm pretty sure this was one of the problem-- one of the things that we -- we looked into and -- and we decided we didn't have the money to do at the time, but I think it's going to have to be done or else we're going to have this problem on every site.

DR. ROESSLER: Bob, I think maybe you meant, when you mentioned a date, in January 7th for our --

MR. PRESLEY: January 7th, yeah.

DR. ROESSLER: Yeah, just for the record.

MR. PRESLEY: Yeah, January 7th. Can we -- can we do that? Mark, can you just come back and -- and y'all talk about it? SC&A, what do you think about that, John?

DR. MAURO: Yeah, the way I'm looking at this is that this is an idea to come at a very important problem, its feasibility, its plausibility, how you would actually do it, whether it'll work and -- is still uncertain. And I think the first step is just -- you know, I -- I guess it was Mel that mentioned this -- I believe it was Mel -- you know, we've got to first look at whether -- you know, whether it's plausible to do this in this particular instance, on this site, and maybe this could almost be a pilot investigation. That is, you know, for this site, since we do know -- sounds like that we do -- do know that there is -- that these data do exist, the -- I mean the pocket ionization chamber exist, but the

plausibility of retrieving it, the cost, what it's really going to tell us, there may be some fundamental flaws with the idea, we don't know. But I think that -- so the first step should be taken by -- by which -- just to look into the plausibility of this line of investigation to give us fruitful results in this particular instance. And if we could hear back about the plausibility of it on the 7th, that would be very helpful.

DR. MAKHIJANI: Well -- well, I think Mr. Presley is -- is -- is also right in the sense that we -- we are looking at it in -- in this context, but -- but as has been mentioned, it comes up at many different sites and -- and -- and -- well, in a way it's not for us, but it -- it -- this is, to some extent, a generic issue. I mean there's a particularity with NTS because there's more documentation here, but -- but there is -- there is a more general question and maybe a more general method is called for or a general investigation is called for.

MR. PRESLEY: Let's let -- let NIOSH look at this and come back to us with a recommendation

on the 7th. Mark, do you agree?

MR. ROLFES: All right. Okay.

MR. PRESLEY: Hey, Larry? Is he there?

MR. ELLIOTT: I'm here.

MR. PRESLEY: Is that workable for you?

MR. ELLIOTT: I'm sorry, I was distracted in another conversation and so I wasn't paying attention. Can you fill me in?

MR. PRESLEY: All right. We're going to -- we are asking you all to come back with a recommendation on the 7th, that night in our meeting, on whether it would be plausible to look into this issue of checking badges with --

MR. ELLIOTT: PICs.

MR. PRESLEY: -- yeah, PICs and -- and things like that.

MR. ELLIOTT: Given our -- given DOL's constraints included, I understand.

MR. PRESLEY: Right. Right. Okay?

MR. ELLIOTT: We'll certainly be prepared to give you a status report.

MR. PRESLEY: I think that's -- I think that's only fair. Okay? Working group, are y'all satisfied with that?

MS. MUNN: Surely.

MR. SCHOFIELD: Yes.

DR. ROESSLER: Yes.

MR. PRESLEY: All righty, let's go on to 21.

MR. CLAWSON: Hey, Bob, this is Brad.

MR. PRESLEY: Yes.

MR. CLAWSON: I'm going to be back with you for about 20 minutes. They'll come and get me when --

MR. PRESLEY: Okay.

MR. CLAWSON: -- exactly I've got to run, so I --

COMMENT TWENTY-ONE: EXTREMITY DOSIMETRY

MR. PRESLEY: All righty. The TBD does not contain information about extremity dosimetry. Mark, do you want to go over that? This is another --

MR. ROLFES: Okay, sure. We do have extremity dosimetry within individuals' DOE reported dose files, and those are used in dose reconstructions when necessary. For example, if the individual has a skin cancer of an extremity for which we need to calculate a dose to that extremity. Let's see, I believe that we have provided an update in the NTS Chapter 6, Revision 1, and let's see, that is Section

6.3.5.3.1 -- let me check on the status. That is currently -- that should be in the currently-approved documentation, so it is currently available. And I believe that -- let's see, our response also addresses the expanded review that was conducted by SC&A as well.

MR. PRESLEY: Right. Okay. Arjun or John, do y'all have a problem with this? As I see it, this is a closed issue. We -- we solved this problem in Cincinnati on the 25th.

MS. MUNN: I think we did.

DR. MAKHIJANI: Yeah, from -- from a TBD point of view. That might have to come up in -- in the SEC, but from a -- if -- if -- if -- yeah, our -- our comment had been -- in -- in our review that there were only rare instances of monitoring, as NIOSH said, prior to '67. After '67 it doesn't seem to be an issue.

MR. PRESLEY: Right.

DR. MAKHIJANI: But I guess if the position is we don't need to reconstruct doses prior to '67 at the present time, I guess -- you know, that -- that's -- then it's not a TBD issue but it might be an SEC issue.

MR. PRESLEY: Right.

DR. MAKHIJANI: Right, agreed.

MS. MUNN: Good.

COMMENT TWENTY-TWO: NEUTRON DOSES

MR. PRESLEY: Let's go on to 22. There are no neutron doses -- neutron dose data until 1966 and partial data until 1979. Mark, do you want to -- we talked about this also. You want to say what our finding was on this?

MR. ROLFES: Yes, let's see, we've got a proposed methodology based on the Pantex site profile, and these are based on recorded dosimeter results for individuals that were working in a production-related environment. Nevada Test Site, once again, was limited to a very defined number of tests involving a defined exposure potential to neutrons. The comments that we recently received also on -- these were public comments that had been sent out to the Advisory Board. This concern was raised by an individual member of the public as well, and this was in regards to Operation BREN and HENRE. We do have data indicating that neutron doses were in fact monitored associated with those projects, the bare reactor

experiment Nevada and the high energy reactions experiment, which were conducted on-site at Nevada Test Site. So I believe that we do have information that would allow us to do a claimant-favorable dose reconstruction.

MR. PRESLEY: That's al-- go ahead, I'm sorry.

MR. ROLFES: Oh, no.

MR. PRESLEY: That's also been reported out in the NTS Revision 1.

MR. ROLFES: Yes. And that's -- that's the portion -- the Page Change 1 portion I believe is still in -- let's see, that's still internal, I believe. Let me verify that -- yes, it's still internal, in review at this time, so...

MR. PRESLEY: Okay. Anybody have anything on that?

DR. MAKHIJANI: Yeah, we -- we've reviewed this, Mr. Presley, in -- in our October review that we submitted to the working group --

MR. PRESLEY: Uh-huh.

DR. MAKHIJANI: -- and had commented then that the use of these NP ratios from Pantex was not well justified and -- and -- in one case 2.5 and in the other case five, and in general have

some discomfort with -- with NP ratios from other sites being transferred to -- you know, intersite use of NP ratios seems -- seems to pose some difficulties in terms of (unintelligible).

DR. MAURO: I'd like to add, though, that the first part of your response dealing with the tests and the contribution of neutron exposure as a function of distance, I'm familiar with that and that's certainly true. That is -- so the -- the problem has to do -- I mean if there is an issue here, it has to do with the neutron-to-photon ratio that's being adopted for people who were exposed I guess in the reactor tests.

DR. MAKHIJANI: Right, on the methodology in regard to the tests, we -- we -- we didn't reproduce the calculations, but saw no problems.

DR. MAURO: Yeah, we -- yeah, that the -- yeah, we agreed that the -- the neutron doses at -- at a distance are not going to be a problem. But right now -- I think that was one of our findings in the -- in the Pantex, even though -- I know that's right now being held up for

various reasons, but that wa-- that was one of our concerns, and not only the Pantex ratio but also, as Arjun pointed out, the -- the use of other site data in this context, and we're actually working on -- with -- with the working group whe-- on the -- under what conditions can you use other site data. This is certainly an area that has been actively investigated by other working groups.

MR. ROLFES: Okay. One of the important things to mention I guess, also the Operation BREN, the Bare Reactor Experiment Nevada, one of the primary concerns was potential neutron exposures associated with an atmospheric test, and we do have quite a number of civil effects experiment documents that were conducted by -- this was under the civil effects test operations, CETO, I believe, that was quite an elaborate study and quite a bit of detail associated with this test in order to determine neutron doses and gamma doses at various distances and reactor heights or source heights on the BREN tower. The individuals that had a potential for neutron exposure in these scenarios were in fact monitored, and I think

that's the important point.
In relation to the device assembly individuals -- so the bottom line is that atmospheric testing, the people that were in a potential to be -- well, there really was no potential during the atmospheric testing time period for the great majority of individuals. The one exception we've mentioned is potentially a flight crew from the military that could have been in the air during a test.
The individuals at NRDS and those associated with Operations BREN and HENRE were also monitored. Furthermore, we do have documentation at the NRDS of the gamma and neutron dose rates surrounding the reactor at various distances. Those could simply be used to apply a neutron-to-photon ratio because it is documented the highest recorded exposures received on these reactor tests for each reactor test. So there -- there are a number of pieces of information that we could use to assign neutron doses from various operations and --
DR. MAURO: Mark, I'd be interested in how tho- - those ratios stack up against the -- the 1.7

(unintelligible) value that you were thinking about using originally. Other words, have you sort of confirmed that the 1.7 was a good number or does it show that the actual data you have -- maybe the 1.7 was not very claimant favorable?

MR. ROLFES: Well, let me -- let me pull up a --

DR. MAURO: Because this goes a little bit toward this question of other site data, it's -- it's almost like a test case.

MR. ROLFES: Let me see if I can find this reference here.

MR. SMITH: Mark, while you're looking -- this is Billy.

MR. ROLFES: Yes, Billy.

MR. SMITH: I actually worked on Project HENRE at NRDS. That was a linear accelerator so there was no gamma associated with that particular operation. Only when the BREN tower was in Area 4 -- it was a bare reactor, it was a research reactor that -- that's now back at Oak Ridge at DOSAR -- would there have been some gamma associated with neutrons.

MR. ROLFES: Okay. I do have, for example --

this is from the Los Alamos Scientific Laboratory, environmental effects of the QETNT* effluent, a review and evaluation report. I am looking through this document and there is a table at various distances from the reactor that have integral gamma and neutron data at 100 and 200 feet. At the closest measurement, which was 100 feet from the reactor, the gamma dose rate was -- let's see -- about three -- let's see, let me make sure I've got this right -- this was an integral dose, so it was a total of 3,640 rad for gamma exposures. The neutron exposure was 65 rad, so --

DR. MAURO: Okay, so it was (unintelligible).

MR. ROLFES: -- we're talking about -- yeah, we're talking about a couple of orders of magnitude difference, so an individual that was associated with the project that received gamma dose likely would not have received a significant neutron dose without receiving a very large gamma dose, is -- is the bottom line.

DR. MAURO: Uh-huh. That -- that sort of validates that the 1.7 if you were to -- if we did use that, at least in -- from the

comparison you made, it would be very claimant favorable.

MR. ROLFES: Yes, very.

DR. MAURO: In fact to the point where -- yeah, okay. All right, that's helpful.

MR. PRESLEY: All right, we're going to mark this one closed.

COMMENT TWENTY-FOUR: HIGH-FIRED OXIDES

Okay, let's go on to 24, presence of high-fired oxides resulting from atmospheric weapons testing and reactor testing needs to be investigated. Mark, y'all did a tremendous amount of work on that.

MR. ROLFES: All right. Yes, I did just receive notification of a revision to TIB-49 which addresses plutonium strongly retained in the lung, and that basically gives us adjustment factors to -- based on the data that we have for a particular claim, on how to assign a claimant-favorable dose estimate for high-fired oxides or very insoluble plutonium.

MS. MUNN: This has been well covered by many workgroups and I think --

MR. ROLFES: Yeah, and also --

MS. MUNN: -- most of them agree it's done.

MR. ROLFES: I apologize, I talked over you a little bit, Wanda. And also obviously from the atmospheric weapons testing period there is an SEC that has been designated for the '51 through '62 time period, so...

MR. PRESLEY: Yes, I'm going to mark that one complete.

COMMENT TWENTY-FIVE: SITE EXPERT INTERVIEWS

All righty, 25, NIOSH documentation of site expert interviews is inadequate. Mark, you all have gotten with SEC and -- or SC&A and done a tremendous amount of work I know back on that. Do you want to discuss your all's findings with that?

MR. ROLFES: Well, in addition to those listed in this document, there are additional interviews once again that have been conducted following the Special Exposure Cohort submission that we received, so as far as for the -- and those -- the summarization of those interviews has been presented in -- in what I've related to you today as well, so I don't foresee us needing to do anything else with this.

MR. PRESLEY: No. Arjun?

DR. MAKHIJANI: Yes, Mr. Presley, I agree with that. Just as a kind of FYI, the -- the broader interview procedure -- now NIOSH has a very formal procedure for documenting interviews now and -- and we've reviewed that separately as part of our Task III work, and Ms. Munn, you have that report.

MS. MUNN: Right.

DR. MAKHIJANI: We haven't discussed, I don't think, at any of our meetings, but -- but you have that report.

MS. MUNN: Right, I do.

DR. MAURO: I think that's OTIB-97 --

DR. MAKHIJANI: Yeah, so --

DR. MAURO: -- or Proc. (unintelligible) --

DR. MAKHIJANI: -- so Mr. Presley, I -- I agree with Mark, it's --

MR. PRESLEY: Okay.

DR. MAKHIJANI: -- closed.

MR. PRESLEY: Yeah, we had a -- y'all sent me an e-mail message on that.

COMMENT ELEVEN: ENVIRONMENTAL DOSE

Now we're through the 25, except we need to go back to 11. Arjun had to leave. Arjun, what we said we were going to do is wait till you

got back and then go back and discuss 11, so if everybody (unintelligible) --

DR. MAKHIJANI: Yeah, (unintelligible).

MR. PRESLEY: -- everybody would, go back to 11, which has to do with correction factors for extreme environmental doses and --

DR. MAKHIJANI: Where am I? I've lost my -- number 11, okay. Yeah, before I -- I'm very sorry, again, I had to leave like that, but I -- we -- we did -- we had overlooked number 11 because it was about environmental dose, but it actually had been a revision in -- in Chapter 6 and I had overlooked it, thinking that we were not to review environmental doses. Since our last working group I had asked our team to prepare responses to this. Unfortunately, we've got two different pieces of paper. They aren't consolidated or internally reviewed. I'm sorry they aren't ready yet, but I will -- I will send you this piece of paper immediately after the first of the year, so about a week before the Board meeting.

MR. PRESLEY: Okay, 'cause I -- you know, we're going to have to have that meeting on the 7th. I'd like --

DR. MAKHIJANI: Yes.
MR. PRESLEY: -- to be able to discuss this --
DR. MAKHIJANI: Yes.
MR. PRESLEY: -- as one of the action items and saw that off at that time.
DR. MAKHIJANI: Yeah, you -- you will have this several days before -- before the meeting on the 7th.
MR. PRESLEY: Okay.
DR. MAURO: I've got just a quick question on the response that's provided by Mark. I notice that you did an analysis of angular or directional dependence.
MR. ROLFES: Uh-huh.
DR. MAURO: And based on your analysis, you felt that there was -- there is -- the adjustment factor is one. That is, there really --
MR. ROLFES: Exactly.
DR. MAURO: -- is no effect. Did you -- did you do that based on -- you ran some models and -- and how the -- did -- the flux would hit -- hit the -- other words, what am I -- am I to understand what you're saying is a person was standing in a contaminated area, let's say it

was a -- the ground was contaminated. You're saying that the -- the angular direction doesn't really change the -- the response of the film badge?

MR. ROLFES: It does not change it where it would exceed our claimant-favorable dose conversion factors.

DR. MAURO: Oh, I see.

MR. ROLFES: And certainly in light of our -- our assumptions that we make when we complete a dose reconstruction, we are already incorporating various correction factors for energy spectra and -- let's see, radiation energies -- let's see, I'm trying to recall off the top of my head other -- but the bottom line of the study was that we did take a look at whether separate external dose correction factors from environmental contamination would result in a -- in a higher dose to the individual than what the badge would have reported, and we did not find that to be the case.

DR. MAURO: Did you -- did you do this by a -- like an MCMP type calculation?

MR. ROLFES: I'll actually ask Gene Rollins for

clarification. I know that this was done quite a while ago and -- let's see, I believe we had addressed this -- let's see, that was in Rev. 1 of the NTS external dosimetry TBD. Let's see -- and -- do we have Gene on the line? I'd like to see if he could explain a little bit more detail. I believe it was Richard that had conducted this analysis.

MR. ROLLINS: Yes, I'm -- I'm here, Mark.

MR. ROLFES: It's been a while and I'm trying to recall exactly what was done. I know we did document it and it has been --

MR. ROLLINS: Well, we -- we worked up the geometry factors and -- if I'm remembering correctly 'cause it was done some time ago -- it turned out that the -- they were less than one.

MR. ROLFES: Yes.

MR. ROLLINS: And so we decided just to leave them as one, to be claimant favorable.

MR. ROLFES: Yes.

DR. MAURO: And this would be the fa-- let me just see if I have it right. So you get a reading on your dosimeter -- let's say a film badge -- that reads 100 MR was -- the -- was

darkening on your -- your film badge, but you're saying that -- that would -- but that's of course determined under a certain set of calibration conditions if the -- you're saying the way in which you convert the -- the -- the optical density reading on the film badge to an organ dose, the way it's done now, is more than adequate to account for the fact that the -- the film badge may not respond -- under-respond if the angle of incidence is -- let's say not perpendicular but say a much more severe angle, you're saying that -- that the -- 'cause I know when we did some calculations we found that the angle of incidence did have a -- and the energy of the photon did have a very significant effect on how the film badge would respond and -- but you're saying that you -- taking that -- even taking that into consideration, your -- your adjustment factors are more than sufficient to account for that?

MR. ROLLINS: That's correct. Badges would not have under-responded.

DR. MAURO: Did we -- do we have -- did we see that? Did we -- has that report been -- is that contained in any of your documents that we

have available to us?

MR. ROLFES: Did we document that in the site profile, Gene? I --

MR. ROLLINS: The actual -- the actual calculational package? No.

MR. ROLFES: No, okay.

DR. MAURO: I -- the -- I only bring it up because I recall in another -- for some other purposes, we did -- we did some analysis like this and we did see a substantial, you know, under-response on the ang-- when the energy is low and the angle of incidence is -- is off -- is not perpendicular, you could really -- and I was just surprised that, you know, you're okay.

MR. ROLLINS: We could -- we could -- I guess -- I'm going to leave that up to Mark, but I presume we could make that package available.

MR. ROLFES: Yeah, that's -- I'm trying to recall, I -- I wanted to look back and see if I could find -- I don't have those -- I thought we had closed this issue at the last --

MR. PRESLEY: Yeah, we had.

MR. ROLFES: -- working group meeting.

DR. MAURO: We did? Please, I apologize. If this has been closed, I --

MR. PRESLEY: We closed this.
DR. MAURO: I don't want to open it up again, I just wasn't --
MR. PRESLEY: You all -- you all met with this -- with NIOSH and closed this thing about the -- about the interviews. That's what I've got --
DR. MAKHIJANI: Yeah, yeah, we -- we -- the documentation of the interviews?
MR. PRESLEY: Right.
DR. MAKHIJANI: Yeah, John -- John, we did.
DR. MAURO: No, I'm talking about this angle of incidence response --
DR. MAKHIJANI: Oh, the angle of incidence thing?
DR. MAURO: Yeah, I mean the -- I -- I -- we're on number 11. Right? I assume we're on number 11.
MR. PRESLEY: Yeah, I'm sorry.
DR. MAURO: Yeah, number 11.
DR. MAKHIJANI: Number 11 is not -- Mr. Presley, number 11 is not --
MR. PRESLEY: Right, right.
DR. MAKHIJANI: -- closed 'cause we haven't given you our response to it.

MR. PRESLEY: Yeah, that's right.
DR. MAKHIJANI: But we will do that before -- before...
DR. MAURO: And the reas-- that -- that was -- for the question was do we have the analysis that was done. Sounds like that there wasn't qui-- there was an analysis done by NIOSH that was a while back, and my question was did we have an opportunity to look at it. And the only reason I brought it up was I was surprised to see, given a -- you know, a low energy photon coming in at a high angle of incidence, our -- my expectation is that you could really underestimate a dose if you don't take that into consideration.
DR. MAKHIJANI: Yeah, well, we're -- we're going to file -- we're going to file our response and -- and -- and you -- yeah.
DR. MAURO: Okay, but they have a report apparently that -- that we haven't seen.
DR. MAKHIJANI: No, we have.
DR. MAURO: Oh, you -- we do have it. Okay, that was my question.
DR. MAKHIJANI: This was -- yeah, this was -- this was a problem that -- it was a omission on

our part, John, which I just said is --

DR. MAURO: Okay.

DR. MAKHIJANI: It was there and -- and we didn't -- we overlooked it and so in -- in our general review of external dose issues and that's why we had to go back and do this separate piece of work.

DR. MAURO: Oh, okay. So we still owe them a -- a -- our responses.

DR. MAKHIJANI: Right.

DR. MAURO: Okay.

MS. MUNN: Arjun, as a small heads-up, are you seeing major problems here with the report that you're putting out?

DR. MAKHIJANI: I don't know actually, Ms. Munn. I -- I -- I farmed this out --

MS. MUNN: Or it's too early to ask. Okay.

DR. MAKHIJANI: -- I farmed this out and I haven't -- I haven't had a chance to go through it carefully.

MS. MUNN: Oh, fine, fine.

DR. MAKHIJANI: I wish I could brief you.

MS. MUNN: It was just -- my only thought was time constraints with the meeting we're going to have (unintelligible) before --

DR. MAKHIJANI: I will try to send it to you as soon as possible.

MS. MUNN: No problem. Thank you.

MR. ROLFES: And also keep in mind that if you are an individual that is working in a contaminated environment, and if it's an environmental area where there's a low dose rate based on background contamination, it's very unlikely that an individual's dosimeter would even register a positive dose given the low dose rate associated with an environmental contamination scenario. I don't see significant environmental doses being accumulated by an individual at the Nevada Test Site.

DR. MAURO: The only -- the only comment I have is that it sound like, notwithstanding whether there is one or not -- a detectable dose -- the -- the argument is being made here that -- that the angular -- direction really does not need to be taken into account because built into the calculational method and converting from a film badge reading to an organ dose that you have sufficient conservatism built into that adjustment factor to account for any angular

dependency.

MR. ROLFES: Exactly.

DR. MAURO: And -- and -- yeah, and I believe that's true, but we haven't reviewed that.

MR. ROLFES: Okay, so --

DR. MAKHIJANI: Why don't we just revisit that (unintelligible).

MR. ROLFES: Okay, so as you are aware, if we have a non-positive dose from an individual working in an environmentally contaminated area, we would assign a missed dose to that non-positive dosimetry cycle, so --

DR. MAURO: Okay.

WRAP-UP AND FUTURE PLANS

MR. PRESLEY: Okay. Now, we're through our 25 items. We have the comments that Mark has added from the external dose section of the NTS technical database. Mark, to my knowledge, all of these have been closed.

MR. ROLFES: All right.

MR. PRESLEY: Now, you know, we've got to go back and look at that thing, and I was wondering, has anybody -- has everybody had time to look at this or has anybody got any comments on these responses?

MS. MUNN: I don't have any grief with them myself. I was wondering what -- what else do we need to look at? Do we have any -- any issue from SC&A on these?

DR. MAKHIJANI: (Unintelligible) didn't go over these (unintelligible).

MS. MUNN: I -- I thought we were finished with them.

MR. PRESLEY: Yeah, I did, too.

MS. MUNN: (Unintelligible) comments on the external dose section. So we -- we've worked the external dose thing pretty well and I thought we'd come to closure with...

DR. MAURO: It looks like we've talked about -- I mean beta dose, there is this list of radionuclides that -- aren't these similar to the ones we just discussed --

MR. PRESLEY: They are a -- they're -- every one of them are out of the same thing we just discussed.

DR. MAURO: Yeah, that's what I -- that's what I -- I'm looking at them and that's what appears to be the case.

MR. PRESLEY: Yeah, these were --

DR. MAURO: Are there any here that we -- that

are new? When I say new, I -- are not already covered by the above 25?

MS. MUNN: I don't think so. The comments are all -- you know, responses that were made to the -- to the first revision.

MR. CLAWSON: Hey, Bob --

MR. PRESLEY: Yes.

MR. CLAWSON: -- this is Brad. I'm going to -- they've come to get me now so -- are we -- one question I wanted to find out before we left, are we going to need to meet the 7th?

MR. PRESLEY: Yes.

MR. CLAWSON: Okay, so --

DR. ROESSLER: Do you have a time?

MR. PRESLEY: 7:00 o'clock.

DR. ROESSLER: Oh, good, okay.

MR. SCHOFIELD: What time?

DR. BRANCHE: All right, Bob -- Bob, this is Christine.

MR. PRESLEY: Yes.

DR. BRANCHE: So you're going to definitely do that? You're definitely going to see the need for the meeting at 7:00 p.m. on that --

MR. PRESLEY: Yeah, we're going to --

DR. BRANCHE: -- Monday the 7th?

MR. PRESLEY: Yeah, we're going to have to to go -- 'cause we've got some stuff to go over so that hopefully we can make a recommendation to the Board.

DR. BRANCHE: Okay, I just -- I want to make sure 'cause I got to make arrangements for Zaida to have the room arranged. We -- we sent it up as tentative. Now I can confirm it with her.

MR. PRESLEY: Yeah, yeah.

DR. BRANCHE: Okay.

DR. ROESSLER: But that's in the hotel, our meeting hotel.

DR. BRANCHE: It will be in the hotel, yes.

MR. PRESLEY: And --

DR. BRANCHE: And we'll get details to you, Bob, and the -- and the rest of the committee.

MR. PRESLEY: Okay, sounds good.

MR. CLAWSON: I just want to make sure I'll get my schedule figured out for that. I know that that was tentatively -- we went from there, so we'll see you on the 7th then.

MR. PRESLEY: Okay, thank you, Brad.

MR. CLAWSON: Okay, thank you. 'Bye.

MR. PRESLEY: Okay.

MS. MUNN: We should be able to use the same room as procedures.

MR. PRESLEY: Right, that's exactly right. I don't see a problem. Y'all get through, we'll go in.

MS. MUNN: Yeah.

MR. PRESLEY: In fact, two of us will already be in there.

MS. MUNN: Yep, true.

MR. PRESLEY: Anybody got anything else on these comments?

MR. ROLFES: Yes, is there anything that we need to do with the public comments that we received? We did put together a matrix from the approximately 40 pages of information that were received and we prepared a response and how we've documented our public comments and what we propose to do with the information we've received. If there are any issues there, I'd be happy to discuss those as well, so --

MS. MUNN: That was a staggering amount of information and, as I said, I didn't do my homework. I (unintelligible) not --

MR. ROLFES: Okay.

MS. MUNN: I didn't download that because it

wasn't from Mark and so I didn't -- I didn't think that it was going to be (unintelligible).

MR. PRESLEY: Well, I'll tell you what I've done. I've -- for two nights I've read over those things, spent about four hours a night. Some of them I've gone over more than once. I don't see -- I'm going to be honest with you. I don't see a whole lot of the comments that I think we need to do a whole lot with. There's some of the comments that -- that are going to be incorporated in the site profile, but there's a lot of those things that it would take years and years and years and years and years to go back and check on.

MR. ROLFES: Okay. I believe that we've done a pretty good job at incorporating the issues that would affect the outcome of a dose reconstruction, so --

MR. PRESLEY: I think you have, too.

MR. ROLFES: Okay.

MR. PRESLEY: I don't see a problem.

MR. ROLFES: Okay.

MR. PRESLEY: What I'm saying. Anybody else got anything?

MS. MUNN: Can we hopefully make a short item

of that on our meeting on Jan-- in January?

MR. PRESLEY: I don't see why we can't. Mark, do we need to --

MS. MUNN: I really would like to at least read it over.

MR. PRESLEY: Yeah, yeah, I tell you what let's do. Everybody go back, look at those things. If you have an issue with anything, bring it to the Board on the 7th and we'll discuss it.

MS. MUNN: Very good.

DR. MAKHIJANI: Mr. Presley, is that for the working group or for --

MR. PRESLEY: That's for --

DR. MAKHIJANI: -- (unintelligible)?

MR. PRESLEY: That's for the working group --

DR. MAKHIJANI: Okay.

MR. PRESLEY: -- and we'll -- we'll go at it from there, not SC&A. I'm not asking y'all --

DR. MAKHIJANI: Okay.

MR. PRESLEY: -- to do anything extra right now.

DR. MAKHIJANI: Okay, right. Just clarifying.

MR. PRESLEY: Yeah.

MS. MUNN: Yeah, thank you, Bob.

MR. PRESLEY: Okay?

MS. MUNN: I feel badly about that. Sorry.
MR. PRESLEY: No problem. No problem. It took -- I didn't start reading them until, like I said, night before last.
MS. MUNN: I just didn't realize what they were.
MR. PRESLEY: And --
MS. MUNN: My bad.
MR. PRESLEY: So I appreciate everybody's time and concern and -- has anybody got anything for the good of the working group or anything like that? If not, I'd like to wish everybody a Merry Christmas.
MR. SMITH: Bob, this is Billy Smith.
MR. PRESLEY: Yeah.
MR. SMITH: I sent Mark Rolfes a comment just a minute ago, e-mail, I don't know whether or not he saw it, but it has to do with a comment on item 24. I think NRDL needs to be changed to NRDS (unintelligible).
MR. PRESLEY: Okay.
MR. ROLFES: Thank you, Billy, I did see that and -- let's see, let me get back -- I didn't look in the matrix to see where -- where we had put that.

MR. SMITH: Down at the bottom of number 24. The fact that we were talking about the NRDL document might be confusing if we leave it uncorrected.

MR. ROLFES: Okay. Oh, okay, I see it here, any new guidance would apply to the NRDL -- is what it says -- activities. It should be NRDS.

MR. SMITH: Yes.

MR. ROLFES: My apologies. Thank you, Billy.

MS. MUNN: Thank you, glad you caught it.

MR. PRESLEY: Okay, has anybody else got anything?

MS. MUNN: No, Merry Christmas to everyone.

MR. ROLFES: Yeah, Merry Christmas, Happy Holidays.

MR. PRESLEY: Christine, do you have anything?

DR. BRANCHE: No, I just -- I just know that we're going to be making plans for -- making arrangements for the location on the 7th at 7:00 p.m. Is that right?

MR. PRESLEY: Yeah, and like --

DR. BRANCHE: Okay.

MR. PRESLEY: Like Wanda and I said, we can use the same room. When she finishes up, then I'll go -- come in.

DR. BRANCHE: Well, let's just make sure that that's going to be okay with the hotel, so --

MR. PRESLEY: Okay.

DR. BRANCHE: -- (unintelligible) just wait for notification from Zaida, I'd appreciate it.

MR. PRESLEY: Yeah, we can do that.

DR. BRANCHE: Okay. Merry Christmas to all of you.

MR. PRESLEY: Merry Christmas to everybody.

MR. SCHOFIELD: Merry Christmas.

MR. PRESLEY: And I'd like to thank Mark Ross (sic) for all his help.

MR. ROLFES: Thank you, Bob. Thank you, everyone.

MR. PRESLEY: Merry Christmas.

MR. ROLFES: Happy New Year's and Happy Holidays.

DR. BRANCHE: Merry Christmas, Ray Green.

MR. PRESLEY: Yeah, Ray.

THE COURT REPORTER: Thank you all.

(Whereupon, the meeting was adjourned at 4:12 p.m.)

CERTIFICATE OF COURT REPORTER

STATE OF GEORGIA

COUNTY OF FULTON

I, Steven Ray Green, Certified Merit Court Reporter, do hereby certify that I reported the above and foregoing on the day of December 19, 2007; and it is a true and accurate transcript of the testimony captioned herein.

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

WITNESS my hand and official seal this the 25th day of January, 2008.

_____

STEVEN RAY GREEN, CCR, CVR-CM

CERTIFIED MERIT COURT REPORTER

CERTIFICATE NUMBER: A-2102