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 in Cincinnati, Ohio, on Oct. 25, 2007.

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C O N T E N T S

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P R O C E E D I N G S

(9:00 a.m.)

WELCOME AND OPENING COMMENTS

DR. WADE: We're going to begin.

This is Lew Wade and as always I have the privilege of serving as the Designated Federal Official for the Advisory Board. And this is a meeting of a work group of the Advisory Board, particularly this is the work group looking at the Nevada Test Site site profile. That work group is chaired by Robert Presley, members Clawson, Munn, Roessler and Schofield, and I believe they're all in the room.

Let me begin by asking if there are any other Board members who are on the call by telephone.

(no response)

DR. WADE: Are there any other Board members on the call by telephone?

(no response)

DR. WADE: Good, the reason I asked that is that we really can't have a quorum of the Board, and we don't. We have five Board

members present; a quorum would be seven.

So what I would suggest we do is go around the table and make our introductions, and those directly involved in the process please identify if you come to the table with a conflict. And then we'll go out into telephone land and hear from those involved on the telephone, a little bit of phone etiquette discussion, and then we'll begin our deliberations.

This is Lew Wade. I work for NIOSH and support the Advisory Board.

MR. CLAWSON: Brad Clawson, Advisory Board member, no conflict.

DR. ROESSLER: Gen Roessler, Advisory Board member, no conflict.

MS. MUNN: Wanda Munn, Advisory Board member, no conflict.

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

MR. SCHOFIELD: Phillip Schofield, Board member, no conflict.

MR. RICH: Bryce Rich, ORAU support, conflicted.

MR. CHEW: Mel Chew, ORAU team, not

conflicted.

MR. ROLFES: Mark Rolfes, NIOSH Health Physicist, no conflict.

MR. PRESLEY: Robert Presley, Board member, no conflict.

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

DR. WADE: Okay, let's go out onto the telephone. Other members of the NIOSH or ORAU team, please identify yourself.

MR. ROLLINS (by Telephone): This is Gene Rollins. I am O-R-A-U team, not conflicted, and I'm the document owner.

DR. WADE: Thank you, Gene, welcome, we're glad you're with us.

Other members?

MR. SMITH (by Telephone): This is Billy Smith, Chew team, conflicted.

DR. WADE: Other NIOSH/ORAU team members?

(no response)

DR. WADE: How about SC&A team members?

DR. MAURO (by Telephone): Yes, this is John Mauro, SC&A, no conflict.

DR. WADE: Other SC&A team members?

MR. ZLOTNICKI (by Telephone): Joe Zlotnicki, SC&A, no conflicts.

MR. PRESLEY: Can we have the name again, please?

MR. ZLOTNICKI (by Telephone): Joe Zlotnicki, that's Z-L-O-T-N-I-C-K-I.

DR. MAKHIJANI: He's one of our external dose experts.

DR. WADE: Welcome.

Other members of the SC&A team?

(no response)

DR. WADE: How about workers, petitioners, or any of those fine people with us this morning?

(no response)

DR. WADE: Other federal employees who are on the call by virtue of their federal employment?

MR. RAFKY (by Telephone): This is Michael Rafky with HHS.

DR. WADE: Welcome, Michael.

Is there anyone else on the call who would like to be identified?

(no response)

DR. WADE: We have one new presence at the table.

MS. HOWELL: Emily Howell, HHS.

DR. WADE: And then very briefly because we've been doing very well on the telephone, but again, if you're speaking, speak into a handset as opposed to a speaker phone. Mute whatever you can in your area if you're not speaking, and be mindful of background noises. Though I must say the last three or four calls have been without flaw really, so thanks to all of you for that.

Robert?

INTRODUCTION BY CHAIR

MR. PRESLEY: What I would like to do today if that's acceptable to other working group members is we will work off of the matrix that Mark sent out on 10/17/07. It is a complete new matrix. Then when we get to an issue that involves SC&A and NIOSH's response, we will pick the second one up that Mark sent out, and it has the SC&A comment, and it also has the NIOSH remark on it, and we will use that. And then once we finish that response up, we will go back to the original database and go through it.

What that will do, I hope, is keep us from going through some of this stuff that

we've already done once. Is that acceptable to everybody?

(no response)

MR. PRESLEY: We've got some backup data that I have here. It's also on your machine, if you can get online, and we will use it in our discussions for backup on some of these responses today.

DR. MAKHIJANI: I didn't understand that.

MR. PRESLEY: The documents that were sent out this past week or so on the interview with Bruce Church and some of the other stuff is what I'm talking about.

Okay, everybody ready to start? Anybody have any questions?

(no response)

COMMENT 1: SOME RADIONUCLIDE LISTS ARE NOT COMPLETE

MR. PRESLEY: I'd like to start with Comment 1, an old comment that says, "Some radionuclide lists are not complete." We have worked this over. Things have been added, deleted, Table 2-8 has been removed from the TBD, and Table 2-3 and 5D-13 are not appropriate at this time. We've discussed this in our past meeting. We decided that the

review was complete for this, and that the working group would review when the total TBD comes out. Is that correct?

DR. MAKHIJANI: I believe that that's right. And you've published one of the TBDs, right?

MR. ROLFES: That's correct. The external dose TBD came out shortly before the last meeting.

DR. MAKHIJANI: Right.

MR. ROLFES: And you had reviewed that. Also, the site description has been released as recent, and I did send that around to the working group members and SC&A. But additionally, the internal dose TBD is currently in review at OCAS so we should have that finalized relatively soon.

DR. MAKHIJANI: And as I told you just before the meeting, I opened the site description revision but have done nothing with it. I have no instructions to do so.

COMMENT 2: REACTOR TEST RE-ENTRY PERSONNEL

COMMENT 3: HOT PARTICLE DOSES

MR. PRESLEY: Comment 2 is the Technical Basis Document does not provide adequate guidance for dose estimates to the gonads,

skin, gastrointestinal tract for early reactor test re-entry personnel. Large hot-particle doses to the skin and the GI tract have not been evaluated. Naval Radiological Defense Laboratories (NRDL) documents and models have not been evaluated though one document is referenced.

There are Findings 2; there's an issues list. We have discussed this in the past. SC&A has a response regarding the NRDS. Arjun, do you want to go over you all's response first?

DR. MAKHIJANI: Basically, we agreed with part of NIOSH's response. I think we have a common understanding that there were hot particles there, but we did not see in the revised external dose site profile was any evidence for the assertion whenever there were hot particles that measurements were actually made.

So that was the main issue that was outstanding, both consolidated Comments 2 and 3 in our response, because they're the same response, Test Site as well as Reactor Development Station. And so we cited again

the report of the NRDL, the Naval Reactor Development Laboratory, that there were hot particles especially in that one test.

Unfortunately, Lynn Anspaugh is not on the call. He might have not noticed that there is a call, and I didn't send him an e-mail about it. But he also kind of felt that the response was insufficient. And we had a whole team perform this review, and they are named in the review. I see there's been an interview done. So that was the basic substance of the response that there was no evidence that measurements were actually made, that there was some systematic procedure in place throughout the period when there was vulnerability of hot particles.

MR. ROLFES: In order to address --

Were you finished, Arjun?

DR. MAKHIJANI: Yes.

MR. ROLFES: In order to address the hot-particle exposure issue, we went back and did another records review, found several documents related to the Nuclear Reactor Development Test Station which had characterizations of hot particles that were

released. We spoke with a person who worked intimately in hot particle research and have provided the Advisory Board with a draft copy of his interview notes for your review.

Furthermore, we have information for each of the reactor tests which includes beta-gamma dose rate surveys of some of the particles plus the dose rate information for these particles, information regarding gamma doses recorded on personnel dosimeters and discussion of neutron exposures as well. There's also very detailed gamma dose rate surveys and neutron dose rate surveys. So there's a lot of new information that I've recently taken a look at.

Specific to the hot particles I'll go ahead and read our response for this comment on hot particles. The information regarding the NRDS was not in the Rev. 1 of the TBD that SC&A was able to review. Rev. 1 was already under review at OCAS when Billy Smith provided a white paper on the NRDS report.

When the Rev. 1 of the TBD was official, a page change revision of NRDS information was initiated, and it was combined

with the page change regarding the film dosimeter correction factor of 1.25 for the years 1960 to ’65. October 19th, 2007, the combined page change was returned to ORAU by OCAS with comments that are in the process of being resolved.

The following is the statement in the publication record regarding the modified page change. This page change revision incorporates expanded coworker data on pages 42, 43, 45, 46 and 47 in Section 6.4. Text was added to Section 6.5.1, page 58; Section 6.5.2, page 59 in order to address the hot-particle issues. The use of the document, hazards to personnel re-entering the Nevada Test Site following nuclear reactor tests. An additional reference to the text was also added on page 42 as well as to the reference section on page 71.

Furthermore, the records of the individual’s interview that we discussed, provided to the Advisory Board, he was a former NTS NRDS health physicist for DOE. And his expert account clearly demonstrates that the radiological monitoring, including these

contamination surveys, whole body counting, et cetera, frisking after working in a hot area, these methods were in place that would have easily detected hot particles. These were not casual areas, and stringent access control was in place at this time as well in order to minimize the exposures to personnel.

DR. MAKHIJANI: Mark, this was a little bit later in the period, right? This person, for instance, started sort of later on in the ‘60s from what I read in the interview.

MR. ROLFES: He started there in early 1960, ’61 time periods.

DR. MAKHIJANI: Oh, that’s not how I read the interview.

MR. PRESLEY: (Reading) From July ’61 to June ’62, I was employed with the U.S. Public Service, attended school in Utah where I did research measuring fall-out particles in milk and atmospheric testing.

DR. MAKHIJANI: Yeah, that’s not hot particles on site. As I read this, the employment history to be onsite associated with NRDS in the latter part of the ‘60s. Whereas Comments 2 and 3 go back to 1951.

MR. ROLFES: Okay, that's correct.

DR. ROESSLER: So he was not onsite until '66. Is that --

MR. ROLFES: Correct; however, he was, in fact, researching hot particles prior to that time, and these hot particles were associated with the nuclear reactor test itself.

DR. ROESSLER: So his research involved the Nevada Test Site?

MR. ROLFES: That's right, yes.

DR. ROESSLER: So when he talks, in his interview the thing that I felt was missing were dates that we could tie things to, and so what I'm assuming you're saying then is that he was involved there from, with these issues, from '61 to '69. Is that --

MR. ROLFES: I'll have to take a look at the interview here.

DR. ROESSLER: It's in the first question --

DR. MAKHIJANI: Yes, right, the fall-out particles in milk from atmospheric testing is a completely different issue.

MR. ROLFES: Employed by the U.S. Public Health Service at Nevada Test Site from July of '61 to June '62, participated in research

projects measuring fall-out particles in milk from atmospheric testing. Earned a BS degree in molecular biology, radiobiology, a health physics degree at Colorado State --

MS. HOWELL: I'm sorry. Can I interrupt? Can we just be careful? I don't have this in front of me, but this is a site expert, correct?

MR. ROLFES: Correct.

MS. HOWELL: So we need to be careful about sharing too much information so if you could avoid reading the entire thing into the record it would be helpful.

MR. ROLFES: We did receive verbal permission from the individual to use his information, but --

MS. HOWELL: Right, but we still can't...

DR. ROESSLER: Later on in his interview on page six where Bryce Rich asked him a question, Bruce Church said when we started underground testing, 1961 to '62, he's speaking there as though he was onsite.

MR. ROLFES: Yeah, the United States Public Health Service was, in fact, responsible for monitoring of tests offsite. They did some

onsite I believe.

Is that correct, Mel? You did --

MR. CHEW: Yeah.

MR. ROLFES: Okay, so personnel from the United States Public Health Service were, in fact, onsite, but they were more responsible for tracking effluents off the Nevada Test Site.

MR. RICH: They were an integral part of the controls for the radiological --

MR. PRESLEY: That's exactly right. Each time that we had any type of a test, they were very much involved with the pre-testing and also the after the test.

MR. CLAWSON: This is Brad. Was this more for the downwinder or was this for basically on the site? Because, you know, at that same timeframe, this is when the whole downwind issue started coming about. And Bryce, correct me if I'm wrong, but I think a lot of this was pertaining to what was blowing off of the site.

MR. ROLFES: Exactly.

MR. RICH: It did both. They had the, they did onsite monitoring at the peripheries of

the site, but they were also focused on the off-site issues. But as part of the integrated control system that USPH and General Electric, the whole group was an integrated support.

MS. MUNN: But obviously a great deal of attention was paid to weather conditions at the time of each event in an attempt to minimize any exposure both onsite and offsite. It's very clear that they were going out of their way to try to make sure that weather conditions were not detrimental to either the employees or the general public.

MR. ROLFES: Correct.

DR. MAKHIJANI: My only point in this regard is it appears to me that until the late '60s, this person was primarily involved in offsite activities, and the way I read the NRDL documents from 1968 it seemed to me that they were directly involved in evaluating their own radiological information. And they had the personnel to do it. They produced all those documents.

And I would imagine in regard to reactor testing that there might be experts

who might have direct knowledge of that period involved because since the SEC's only for internal dose going back to 1951. I mean the question stretches back all the way to 1951 and the reactor ^ what, in the late '50s? I don't remember the date.

So this is certainly a partial answer to that, to the comment in the white paper that we sent you, or the review that we sent you. This certainly responds partially to that, but I think only partially.

MR. ROLFES: I did want to point out there is a clarification. One of the latest, I got a revised copy of his interview notes. He hadn't had the opportunity to fully go through some of the things because he did give a quick overview of his notes. I do have some notes that are slightly different. I just want to clarify that he was, in fact, at the Nevada Test Site as a member of the U.S. Public Health Service in 1961.

DR. ROESSLER: I think it adds a lot of credibility to his interview if we have those dates because it's not really clear on what we got. Can we assume then that he was there and

involved in what he's discussing covers the period from '61 through '69 when he left?

MR. ROLFES: I would certainly believe so. I don't know if he was there 100 percent of the time at the NRDS. We can certainly ask for a clarification from him.

DR. NETON: I think we need to go back and verify that.

MR. PRESLEY: It plainly states right here that he was here 1961-1962. He was employed by the U.S. Public Health Service at the Nevada Test Site.

MR. ROLFES: Gene or Billy --

DR. WADE: Do you want me to make copies of that? Or is that copyable?

MR. ROLFES: Yeah, I think we can make copies of this.

MR. RICH: It doesn't have the red highlights which indicate it has changes in the original.

DR. WADE: So why don't we get that out to people?

MR. RICH: The red doesn't show. The comments are there. It just doesn't show.

MR. ROLFES: It does have underlying tracked

changes so if you'd like to make a copy of this then, thanks.

DR. MAKHIJANI: Mark, could you just e-mail it to me?

MR. ROLFES: Certainly.

Gene or Billy?

MR. SMITH (by Telephone): Hi, you guys.

MR. ROLFES: Do you recall if Bruce was continuously there at the Nevada Test Site during that time period? Could you go into a little bit more detail about his job functions as you recall, Billy or Gene, either of the two?

MR. SMITH (by Telephone): Well -- this is Billy. I'm not sure about the exact dates of Bruce's campaigns, various campaigns at the NRDS-slash-NTS, but he was with the Public Health Service and that he set up the Health Physics program that NRDS used. And then he went off to school, and then he came back and became the Radiological Programs Director for the Nevada Operations Office.

But I'm not sure about the dates. We could ask Bruce to confirm those. I think you found the only changes that he had to his

original interview notes. But I'm not sure about the exact dates because that was prior to my start in 1966.

MR. ROLLINS (by Telephone): Mark, this is Gene Rollins. I'm looking right now at his revised, the ones that Bruce has made comments on. He made a couple of changes in here. And it appears that he says that he worked for the Public Health Service from '61 to '62. Then he went back and got his bachelors degree in molecular biology. And he said in the fall of 1966, he was hired by Pan Am to run a radiological laboratory and developed and operated the Shadow Shield whole body counter at the Rocket Development Station. So it appears that his involvement with NRDS began, direct involvement with NRDS, according to what he's written here, began in the fall of 1966.

MR. ROLFES: Well, we do have additional information as we indicated about hot particles. This information should be published in Rev. 1 of the, let's see, the internal dose TBD, excuse me, the external dose TBD shortly.

DR. MAKHIJANI: And as you know, I mean, it wasn't there in the version that we reviewed.

MR. ROLFES: Right, it was a recent addition after, I guess after the last release.

Did we want to go on to four, or are there other questions regarding two and three?

MS. MUNN: Is there an action on this?

MR. PRESLEY: On two our action would be to review for completeness when we get the --

MS. MUNN: Rev. 1?

MR. PRESLEY: Yeah.

DR. ROESSLER: What's the -- until we review it then is there any charge to SC&A?

MR. PRESLEY: As far as I'm concerned, no. I don't see anything unless you all do. I'm, you know, we've got the stuff on the hot particles has come in. I think SC&A is, are you satisfied with the comments that --

DR. MAKHIJANI: Well, as I said, we haven't had time to review this, but on quick inspection it seems to be a partial response. And so there is a partial response and that's about as much as I can say. And we haven't seen the revision, of course.

MS. MUNN: So are you going to review it and

be very clear on what portion of the response you don't feel was adequate?

DR. MAKHIJANI: Well, as I said, the hot particle issue goes back to 1951, and this person appears to have been involved from 1966 onward. And so I don't know when these procedures were in place, and when they were introduced and so on. So there's still a gap in terms of what happened in the earlier period.

MS. MUNN: I understand your point. I'm just asking will we have your point clarified in writing --

DR. MAKHIJANI: Well, if you want it clarified in writing, certainly, we can give it to you, but --

MS. MUNN: Once you've had an opportunity to see.

MR. PRESLEY: I think we ought to get that. Is there a consensus of the working group? I have no problem with that.

MS. MUNN: I'd like to be very clear if there are any outstanding issues once you've taken a look at it. I'd like to be very clear on what those are by the time we meet next.

DR. MAKHIJANI: So we'll be happy to send you a memorandum.

MR. PRESLEY: You could do that, send one out. We'll get it to the working group.

DR. MAURO (by Telephone): Robert, this is John Mauro, just a quick question. I'm listening in, and I heard that there now is a revised version of the TBD that explicitly addresses this issue and also that contain within that revised section is the material that we're discussing related to white papers and these interview notes.

I'm also hearing though where we're being basically given authorization to look at this material that is part of a white paper and the other databases and perhaps close the loop as best we can. But we are not being asked to review the new, revised section of the TBD itself, the TBD that's now on the web.

MR. PRESLEY: That's correct.

DR. MAKHIJANI: Is it on the web?

MR. ROLFES: The external dose Revision Zero is, in fact, on the web now. That was the version that you had reviewed that was released right before our previous Nevada Test

Site working group meeting. There is the Revision 1 which has been returned to ORAU now. These are just page changes that incorporate additional information about hot particles.

So there were some internal comments from OCAS, and they were sent back to ORAU for resolution. So as soon as those comments are resolved, Revision 1 with page change information regarding hot particles will, in fact, be approved and placed onto the internet.

DR. MAKHIJANI: I'm confused about all these revision numbers. Revision Zero was old from 2004, and we reviewed Revision 1 from July 2007.

MR. ROLFES: Okay, I apologize. Revision 1 recently had some page changes.

DR. MAKHIJANI: So is the instruction then that we should review those page changes which relate to hot particles or just the site expert, updated site expert testimony which you're going to send me? I'm not quite clear.

MS. MUNN: Yes, I agree. It's not quite clear. And this brings up an issue which

continues to confuse a little bit. And, John, I need to hear from you on this as well.

DR. MAURO (by Telephone): I would like to speak to this a bit and look for some guidance. My thinking on this is I'm taking precedent from what we did on Savannah River. When we originally reviewed our, I guess it was called at the time Rev. 2 of Savannah River, and we entered into the close-out process. Along the way in that close-out process, it was acknowledged that a major revision, Revision 3, was, in fact, coming out.

What happened at that point is a judgment was made that the revisions were of a substantial nature, sufficient that if we were asked to look at, let's say, major portions of the document, that would be more appropriately tagged as a review of a new site profile, granted perhaps with lesser budget.

So I guess what I'm, I'm looking for a little guidance as at what point is a revision to a site profile substantial enough that probably it's appropriate to say that this is a new review, and we move head on as opposed

to a continuation of a review of the earlier version of the site profile? So it sounds to me from this conversation that we did review this July 2007 version, and that the new changes that were made were really minor and don't represent the substantial revision from the document that we previously reviewed.

So in that vein it sounds like that this next version, this page change, is not a major revision. So I would propose that one of the ways in dealing with the fluid nature of this is that some judgment is made as to whether a major revision to a given site profile is imminent or has already occurred. And if it is a major change and the working group feels that there's a need for review, what this really does is what I would say trigger a new site profile review.

Right now I guess I'm not hearing that. I'm hearing that well, there is a new version up that but it's some minor revisions to it. So I guess making that distinction becomes important in terms of what, perhaps what the working group could authorize and what really needs to go to the full Board to

authorize.

I'm putting this forward as maybe a framework for deciding, you know, what really constitutes a continuation of the close-out process of what we began, and what really we should start thinking in terms of what constitutes a review of a new site profile.

MS. MUNN: I agree. You have just articulated at considerable length the confusion that was in my mind. What I was trying to attempt to clarify here was my understanding that when we charge SC&A with doing one of these documents, that these minor revisions that go along during this process of going back and forth with the clearing of your items, was a part and parcel of your contract.

If we have an entirely new, large document issue, then that is, in my view, what I would expect a question from SC&A as to whether or not this constitutes a new instruction for you to go forth and review new documentation. I had not heard anything here that led me to believe there was anything more, a page change or a few minor revisions in wording or insertions, that would

constitute what I would think of as additional instruction from us.

Perhaps we need Lew to weigh in on that.

DR. WADE: And I think you've all defined the issues very well. I think that what we face here is a little bit between, betwixt and between. I don't think that the page changes that Mark are referring to were simply editorial page changes. I think the page changes do encompass some new information with regard to the hot particle issue. So I think that we need to understand that.

I think the Solomon-like approach to this is for the work group, if it would like, to ask SC&A to consider the hot particle issue and the information presented recently, be it in the interview notes or be it in the page changes to the soon-to-be-released site profile, and to provide the work group with a concise statement of its reaction to the presentation of the hot particle issue. I don't think that this warrants tasking SC&A with a new quote/unquote site profile review as we did in Savannah River.

I think John was right. They have reviewed version one. This is some page change containing new technical information to version one, and I think therefore, SC&A should be tasked, if the work group wishes, with the review of the hot particle issue that would encompass that information plus other information that's been provided to them.

DR. MAKHIJANI: Might I add some clarification here? Yeah, I agree that in this case it's a very narrow thing, a change that has happened. But there's a little bit of a broader context in which this is happening.

Mark, correct me if I'm wrong.

The document that we reviewed that was published in July was a complete rewrite of the external dose part of that TBD. We did not review that complete document. We focused only on the outstanding matrix items because that was how we interpreted the working group's charge.

MS. MUNN: That's what you were asked to do.

DR. MAKHIJANI: That's right. And then in the course since we had to read the whole

document we realized there were just a couple of pages, three or four pages, of other issues that came up that we did not present as findings but as helpful suggestions. But there's also now a full rewrite.

Is it a full rewrite of the site description, Mark?

MR. ROLFES: Yeah, I believe so.

DR. MAKHIJANI: I believe it is a full rewrite.

MR. ROLFES: Gene --

DR. MAKHIJANI: I believe this is a full rewrite of the internal dose. I don't know that, I think there's a substantial rewrite of the environmental dose.

MR. ROLFES: Gene, could you comment on that? I believe our site description was, in fact, a full rewrite. Our external dose was a full rewrite that SC&A reviewed, and the ambient intakes, is that going to be a full rewrite as well?

MR. ROLLINS (by Telephone): Yes, it will be. We just about doubled the size of the site description, and chapter four, the environmental intakes or environmental dose,

does represent a complete rewrite.

DR. WADE: Well again for your consideration, when the Board meets at the end of November, we'll talk about tasking SC&A with quote/unquote new site profile reviews for next year. It could be that the work group would like to recommend that the Nevada Test Site site profile be reviewed as a new site profile because of the significant changes. Or you might be comfortable with the level of effort that SC&A has put into it now and not make that recommendation. But that would be the vehicle to get the Nevada Test Site site profile as changed reviewed as a new site profile.

MS. MUNN: This constitutes the real kernel of my concern here. Once the site profile has been reviewed and issues have been raised with respect to it, then we respond to those issues by covering them in a new document. I'm concerned that the new document then, instead of being reviewed simply for comprehension and covering the outstanding issues, does not take us back to ground zero and start all over again.

DR. WADE: It should only do that if the Board assigns it as a new document to be reviewed as was the case in Savannah River.

DR. MAKHIJANI: That doesn't happen automatic.

DR. WADE: So right now you have SC&A focusing on matrix items as touched upon by page changes and that's what they'll do. If the work group would like the full Board to consider asking SC&A to give a complete review of the new quote/unquote Nevada Test Site site profile, that's within the Board's purview, but the Board has not done that at this point.

MS. MUNN: Since all of the changes that were made were made as a result of the findings of the original matrix, then it follows in my mind that this is simply a response to the findings and not a new document as such. But that's the issue where one makes the decision as to how much constitutes a new document as opposed to a response to previous findings.

DR. WADE: Well, if you look at what Savannah River taught us, Savannah River really, the need for a re-review resulted from

the fact that the original document was stale. It hadn't been looked at. It sat. Things changed not as the result of an active review, but things change, and therefore, it was thought appropriate for SC&A to take a new look at that document. In this case you're engaged as a work group engaged. It's different. It doesn't mean you can't ask for another review if you like.

MS. MUNN: Quite different. It doesn't seem reasonable to me. It seems to me that this is a continuation of the same activity since we have had this under review and have had it actively being reviewed for the last year and a half. We haven't really and truly let up on it.

DR. NETON: I might offer our experience we have with Bethlehem Steel. It's one of the first ones that went through this process. We had a matrix very similar to what is used now. Went through and discussed all those matrix items and went through the comment resolution process, and then at the end of that we issued a new revision to Bethlehem Steel which was never reviewed by SC&A or asked by the working

group to review.

Now that might be a little different because at that particular point I think SC&A and NIOSH came to a consensus on all the open matrix issues. What's different here, I think, is that you're seeing that there still are some open items that are not going to be addressed.

DR. MAKHIJANI: In Bethlehem Steel it was, it took a long time, but there were six outstanding, if I remember, there were six outstanding items.

DR. NETON: We worked it down to six issues.

DR. MAKHIJANI: And then we had agreement on all of them. And then there were papers or something on --

DR. NETON: Yeah, there were position papers similar to these white papers that are floated here. And I think that the key difference is though we came to an agreement that the matrix issues were all addressed and closed.

DR. MAKHIJANI: Right.

DR. WADE: And that's what we're trying to do.

DR. NETON: That's what we're trying to do

here. So if it's going to stay open forever because consensus can't be agreed to then I don't know where that goes. Because essentially what would happen is SC&A would be tasked with reviewing the new revision that are open matrix items, and they will comment on those open matrix items that weren't addressed in the new revision, and that would be the endless loop.

DR. MAKHIJANI: Unless the Board stops it or makes a decision that gives you some advice or --

DR. NETON: Exactly.

DR. MAKHIJANI: Yeah, I mean, we, whether it's a continuation of the matrix process or a new review or basically from the trenches, it doesn't look that different except if it's a whole new review. Then you really, then you look at the whole document.

DR. NETON: But the point is you're unlikely to find anything in the revision of a site profile that is going to be different than where our position stands in the matrix. So to commission a brand new review of the site profile, I think would reveal very little

other than the matrix has not been completely come to a full resolution.

DR. WADE: So just to move forward. Where we are now is that by virtue of tracking the matrix, there's a hot particle issue. There's been information generated by NIOSH separate the page changes and within the page changes. And the work group now has to decide if it wants to ask SC&A to look at the hot particle issue within the context of both the page changes and the new information. And if you do, SC&A will do that. If you want to give them some subset of that to consider, then they'll do that.

MS. MUNN: Well, it was my understanding that that's what we were asking them to do is to look at the new information that's been generated, and then it was my request earlier that once that's done that we see a memorandum from them saying yes to this, yes to this, no to this. We still don't see this covered. That's why I asked for a memorandum being very clear about where any outstanding issues remain.

DR. WADE: And the new information would

include the page changes in the site profile, Wanda?

MS. MUNN: Yes.

MR. PRESLEY: Correct.

DR. WADE: Okay, then that's everything, and it's clear I think.

MR. PRESLEY: Brad, do you have anything?

MR. CLAWSON: Yeah, I am. I just want to make sure when we make changes, I know that we -- and I've seen it in other portions where, yeah, we've made some changes. We're addressing, say, the hot particle, but also we've made some other changes. I just want to make sure that all the new information is being reviewed. I just want to make sure that is, because sometimes in the review process, I just want to make sure that everything's being looked at as we go forward, and that's my only concern.

MR. PRESLEY: Gen, you got comments on this?

(no response)

MR. PRESLEY: Yeah, I think it's a consensus of the working group.

Phillip, do you have any comments?

MR. SCHOFIELD: No.

MR. PRESLEY: I think it's the consensus of the working group then that SC&A be asked to comment the pages as described and present us with a white paper with their comments on those pages pertaining to the hot particle issue.

DR. MAKHIJANI: And I guess you'll send us the page changes.

MR. ROLFES: They're in the matrix right here.

MR. PRESLEY: Is that agreed by everybody?

MS. MUNN: Yes.

MR. PRESLEY: Arjun, is that --

DR. MAKHIJANI: Sure. I have my notes.

MR. PRESLEY: All right, and that then is our comment from, that's comment two and three. So anybody got anything else from Comment 3?

(no response)

COMMENT 4: ORO-NASAL BREATHING

MR. PRESLEY: Okay, let's move on to four. Integration (sic) of hot particles by reactor testing and nuclear weapons testing due to oro-nasal breathing. Needs to be evaluated. This issue will be included in a Board meeting

schedule. I don't know when that's to be done.

Jim, can you --

DR. NETON: Let me say a few things about this. I've just been looking this over again, and I --

DR. MAKHIJANI: It should have been corrected, actually.

DR. NETON: I think that this was mischaracterized, yes.

DR. MAKHIJANI: We discussed this last time, and we haven't revised the matrix so since you are revising the matrix maybe I could send you a correction.

DR. NETON: I know we talked about that.

DR. MAKHIJANI: There should be a correction from our side then.

DR. NETON: Yeah, I think so.

DR. MAKHIJANI: But it's not oro-nasal breathing --

DR. NETON: Exactly, this is not oro-nasal breathing.

DR. MAKHIJANI: -- ingestion of hot particles.

DR. NETON: It's an ingestion of hot

particles. Whether it's through oro-nasal breathing or nasal breathing or wherever, they're non-respirable particles, and they're being ingested.

DR. MAKHIJANI: I'll just write down as a to-do item for from me to send to the working group that that matrix item should be amended to reflect ingestion of hot particles.

DR. NETON: Because I was reading this, and I thought I wasn't prepared to discuss this whole issue again because I thought this was moving on. And, in fact, I think the interview that was done with the person at Nevada Test Site sheds a lot of light on the ingestion of hot particles through these whole body counts that were done and such. And I think those can be tied very nicely together, but it's not an oro-nasal breathing issue.

DR. MAKHIJANI: No, no, I --

MR. CLAWSON: So this isn't one of the overarching issues.

DR. NETON: No, no, this is a non --

MR. CLAWSON: This is a totally different --

DR. NETON: Right, this happens to be a, there's a hot particle, large hot particles

that are considered non-respirable that do not enter into the lung model at all. They just never enter the respiratory tract. So what they're saying is you could inhale those. They deposit in the upper airways for whatever reason are swallowed. How are we dealing with that? That has nothing to do with the ICRP-66 lung model and oro-nasal breathing.

DR. MAKHIJANI: That's correct, yes. No, we did talk about this and settled it last time. There just was no formal way to ensure correction into a matrix.

DR. ROESSLER: So is the ingestion of hot particles settled then? I mean, you agree with the approach or are you talking about the oro-nasal?

DR. NETON: No, no.

DR. ROESSLER: So what happens --

DR. NETON: I think that the issue --

I'm sorry, Gen to interrupt.

DR. ROESSLER: No, so what is --

DR. NETON: The issue is the ingestion of large non-respirable particles and how NIOSH would account for those. I think it's probably limited to the reactor test sites at

this point, but how are we going to deal with that. And my sense is based on what I've just seen from some of those interviews that were done, we need to tie that in with the radiological monitoring programs, and particularly the whole body counting.

I think depending on what timeframe those were done they could shed a lot of light on that. And on top of that it appears that there's some assertions here that hot particles were few and far between. We can deal with it, but we need to address that particular issue which is how do we deal with ingestion of non-respirable hot particles.

DR. MAKHIJANI: And presumably that would not concern the document. We're mostly talking about today that being internal dose.

DR. NETON: Right, and the issue here about to be included in a Board meeting is exactly the issue that I discussed in Naperville which was the oro-nasal breathing issue that really has nothing to do with this Comment 4.

DR. MAKHIJANI: Agreed.

MR. ROLFES: We also have some additional reports and references that we have gotten

access to regarding standard operating procedures for radiation safety. Information on re-entry and recovery safety procedures. Information regarding routine support for nuclear detonations and reactor runs, Onsite Radiological Safety Reports, Onsite Radiological Safety Report for 42-A Operation, Onsite Radiological Safety Report for Kiwi A-Prime Plan 116, Kiwi A-Plan 16 Onsite Rad Safe Report, the NRX Experiment and Kiwi B-1A. So these are just a limited sampling of some of the new radiation safety reports that we've got as well.

DR. ROESSLER: And what dates do those reports cover?

MR. ROLFES: They span from 1959, let's see, 1958, 1959 Rad Safe. Let's see this one. I don't see a date on that one.

DR. ROESSLER: I guess my question is do they cover that period that we were talking about before that Bruce Church maybe didn't, when he wasn't there, and he didn't comment on.

MR. ROLFES: Sure, let me take a look here. The Onsite Rad Safe Report for 42-A Operation

--

DR. NETON: 'Sixty-three is the relevant start date there, is it not? Because --

DR. ROESSLER: Yes, because of SEC --

DR. NETON: -- prior to '63.

DR. MAKHIJANI: That might need some clarification, but aren't you reconstructing external doses prior to '63?

MR. ROLFES: External, correct.

DR. MAKHIJANI: So that's how we were reviewing this. If that's not correct then --

DR. NETON: External dose, not internal.

DR. MAKHIJANI: Not internal.

DR. NETON: Right. I'm saying any internal dosimetry issues prior to '63 are really not relevant for discussion or not necessary for discussion.

MR. ROLFES: Well, the 42-A operation, the Onsite Rad Safe Report that we have is from May of 1961. So, yes, it does go back to the time period that ^. The other report was '58, '59 time period.

MR. RICH: And the test runs, '63 and four.

MR. ROLFES: 'Sixty-three, four, okay.

MR. CLAWSON: Well, when you're saying the

reactors and stuff, is this the, like Janus, the different propulsion systems that they, like Rover?

MR. ROLFES: Yes --

MR. CHEW: Tory and Rover.

MR. CLAWSON: So it'd be covering --

MR. CHEW: The ^ Kiwi oversight and ^. Area 510 and 501.

MR. CLAWSON: Cover the Rover experience?

MR. ROLFES: Yes, it does in fact, and there is information, for example, for Kiwi A plan 116 Onsite Rad Safe Report. This is from September of 1960. Let's see, there are charts in here on, let's see, information regarding soil contamination resulting from the tests.

MR. CLAWSON: That also to cover the cleanup?

MR. ROLFES: I certainly believe --

Gene, I haven't had the opportunity to look through all of these Rad Safe reports that I just recently received. Have you looked at any more of these reports and have anything to add that I haven't mentioned already?

MR. ROLLINS (by Telephone): No, I haven't had a chance to look at them either, Mark.

MR. ROLFES: Okay.

MS. MUNN: So do I understand correctly that Comment 4 should be reworded to read ingestion of non-respirable hot particles by reactor testing and nuclear weapons testing workers by any mode needs to be evaluated. Is that what this statement should say?

MR. ROLFES: Based on our interview also with Bruce, we had some information regarding -- he was one of the personnel that ran the whole body counting unit for Pan Am. And he said that these particles certainly would have been easily detectable. Based on the procedures that were documented and in place for the personnel that were involved with the reactor tests, there were careful surveys done of the personnel. Everyone that entered the area was monitored and time limits were controlled in the area.

DR. NETON: I think Wanda's question was --

MS. MUNN: Yeah --

DR. NETON: Identify the issue. And I agree. I think you've captured it fairly

well.

MS. MUNN: My read of the material you've provided answers that question, but I thought the issue was is the actual Comment worded properly.

DR. NETON: I believe that's a fairly good accurate portrayal of what --

MR. PRESLEY: Can we take that oro-nasal breathing out and input ingestion in there? That should take care of --

MS. MUNN: Well, ingestion starts it though. If it reads ingestion of non-respirable hot particles by reactor testing and nuclear weapons workers --

MR. PRESLEY: Needs to be evaluated.

MS. MUNN: Yeah, needs to be evaluated or by any mode needs to be evaluated, yeah.

DR. NETON: That sounds reasonable to me.

MR. PRESLEY: Okay, we will change that.

MR. ROLFES: Here's the document I was looking for. It's Los Alamos Scientific Laboratory Report entitled the "Environmental Effects of the Kiwi TNT Effluent, a Review and Evaluation". This document does, in fact, have integral gamma-neutron data at various

distances from the reactor test as well as information regarding particle size distributions and radionuclide content. There is quite a bit of detailed information in this document as well.

MR. RICH: Fallout trace.

MR. ROLFES: Yes, quite a bit of fallout trace, gamma dose rates from clouds passing over information, air concentrations, potential doses to thyroids from radioiodines.

MR. SCHOFIELD: Is that document posted on the O drive?

MR. ROLFES: No, I just received it recently, so I'll be happy to make it available to everyone.

MR. SCHOFIELD: Oh, okay, I didn't see it on the O drive.

MR. ROLFES: Would the Advisory Board working group like to receive all these documents on the O drive?

MR. PRESLEY: I would. I'd like that.

MR. CLAWSON: Just where we can look at them.

MR. PRESLEY: The issue on this then is that OCAS is addressing this on a single, on a

project level. Is that correct, Mark?

MR. ROLFES: Well, the --

MR. PRESLEY: There's really nothing else for us to do.

MR. ROLFES: Sure, it's not really a project level, it's not really one of the overarching issues. It's more of an ingestion issue specific to the NRTS, the Nuclear Reactor Test Station. So what we need to do is determine whether there were people that were potentially ingesting hot particles at the site involved in the cleanup. And what I need to do, and what we need to do is review these documents that we have, and in addition, we can probably clarify some of our interview information with the interviewee and see if we can directly account for this.

MR. PRESLEY: Do we need something back from Mark to the working group on their findings on this Comment then?

MS. MUNN: Yes, I think Mark is going to give us an overview of what you see after you've reviewed the documentation, right?

MR. ROLFES: Correct.

Gene, will we be able to provide an

overview of the hot particle ingestion issue then?

(no response)

MS. MUNN: Essentially broaden the response that you have here.

DR. WADE: Gene, you might be on mute if you're speaking.

MR. ROLLINS (by Telephone): You're right, I was on mute. Could you ask the question again, please?

MR. ROLFES: Gene, I just wondered if we'd be able to provide a little bit more detailed description of the hot particle ingestion issue now that we have these additional reports. We certainly need to look at all these Rad Safety reports.

MR. ROLLINS (by Telephone): Yes, we can do that.

DR. ROESSLER: It seems that by the time we get done to the, with this whole package, we will have to develop a timeline and actions to do with the whole NTS site, and this would be one of them.

MR. SCHOFIELD: One quick question on the ingestion of the hot particles. How soon

after these ^ people did the re-entry or in the cleanup did they undergo a whole body?

MR. ROLFES: Well, if we take a look at the interview that we have, based on the controls that were in place, the personnel that did the re-entries went in and they actually have information in one of these Rad Safe documents regarding the number of particles that they were able to measure within a square meter. And you can see that they rapidly disappeared. They rapidly decayed within a day or two. That was also confirmed by the interview that we had completed. So based on what we are aware of, based on interviews in the technical data that we have, individuals that would go into the hot area were surveyed as they exited. If there was any contamination found on these individuals, they were, in fact, taken to have a whole body count. I don’t know the exact timeframe. That is something that we can clarify as well. So --

MR. SCHOFIELD: So this may not turn out to be an issue at all.

MR. CLAWSON: So that would cover their respiratory requirements and so forth for them

to be able to re-enter into --

MR. ROLFES: These individuals were dressed out in anti-contamination. These persons had dosimeters on, both pocket ionization chambers as well as film badges for TLDs, I believe, at this time --

MR. CLAWSON: I was looking more toward the respiratory --

MR. ROLFES: -- and respirators --

MR. PRESLEY: They all had, most of them that I remember, had the full head shield on with the respirator and an air pack.

MR. CLAWSON: Now when we say hot particles in a square meter dissipate, now that’s decay, that’s not blow away.

MR. ROLFES: They are decaying very rapidly. Their half-time is ^.

MR. CLAWSON: I know the wind never blows in Nevada, but it’s just a question.

MR. RICH: Your calibration is just different.

MR. CHEW: I just want to put it in perspective. You remember this information was really to understand the characteristics of the reactor itself, it was part of the

tests, in addition to obviously the safety side of it, but to understand particles, particle sizes, was really what was happening to the reactor itself.

MS. MUNN: That's why they were doing it.

MR. CHEW: Exactly.

MS. MUNN: It was the focus of the experiment.

MR. CHEW: So we're gleaning the information from this as beneficial because of the experimental nature of ^.

MR. PRESLEY: I have item four then. The CDC is going to revise the Comment on hot particles and get back to the working group with their revision. We will look at that then.

Is that all right, Mark?

MR. ROLFES: Certainly. We'll go through these Rad Safety reports and try to summarize some of the important things and to page white paper or some other technical document.

MS. MUNN: Probably just an expansion of the response more than likely will be adequate unless you discover something astonishing.

COMMENT 5: MASS-LOADING APPROACH

MR. PRESLEY: Comment 5, resuspension model, mass loading -- let's see, on this one ^ will review for completeness. To my knowledge there was no action on Response 5 that we needed to take. A white paper from Gene Rollins on the ambient environmental intake at the Test Site has been incorporated into the Technical Basis Document, or the, not the Technical Basis Document.

MR. ROLFES: That's right. It is in the Technical Basis Document. It has not been publicly released yet. It's still a draft Technical Basis Document.

MR. PRESLEY: Okay.

DR. MAKHIJANI: And I believe we had provided you with some comments on that.

MR. PRESLEY: That's correct.

MR. ROLFES: Gene, could you -- Gene?

MR. ROLLINS (by Telephone): Yes.

MR. ROLFES: We'll have to make sure you can hear me. Could you provide some updated information regarding the intake model? Did you address any of the SC&A comments that we received?

MR. ROLLINS (by Telephone): Yes, I did.

MR. ROLFES: Okay, wonderful.

MR. ROLLINS (by Telephone): Most importantly, I think some of the fission activation correction factors where I'd done it for ten years, I broke those out into individual years so we got a little better handle on what the early time correction factors would look like. But I made every attempt to respond to all of those comments, and I revised that paper. And then I used that to help revise chapter four which is currently under review.

MR. ROLFES: Great. Thank you, Gene.

COMMENT 6: AVERAGE AIR CONCENTRATION VALUES

COMMENT 7: RESUSPENSION DOSES

MR. PRESLEY: There's nothing we need to do with five, and if you will go on over to six, it has to do with the site average air concentrations. Then you have a notation here that it says, "See Response 5." On this one it would be five and six together. Anybody have any comment?

DR. MAURO (by Telephone): This is John Mauro. I see that five, six and seven really are all linked.

MR. PRESLEY: That's correct.

DR. MAURO (by Telephone): And I recall that we've been through a process here where, in other words, the discussion we just had on five related to Gene's report, the white paper that originally came out on July 29th, 2007, I believe. And then we provided comments subsequent to that. And then what I just heard is that was there another white paper issued after that or is the next place where the concerns that we raised in the most, the July 29th, concerns we raised regarding your July 29th white paper, are those now addressed in the TBD?

MR. ROLLINS (by Telephone): This is Gene Rollins. John, I think the latter is what you're going to see. I responded to SC&A's comments, and then I took the revised white paper and incorporated those methodologies into the revision of chapter four which is currently under review.

DR. MAURO (by Telephone): Okay, so then would I be correct in saying that the issues raised in five, six and seven are right here in the matrix. The latest position and

response in dealing with those issues is about to be published in a new revision to the TBD?

MR. ROLLINS (by Telephone): That's correct.

DR. NETON: But, Gene, I thought I heard you say that you had revised the white paper to respond to SC&A's comments.

MR. ROLLINS (by Telephone): That's correct. I have.

DR. NETON: So if there's such a document, I just wanted to resolve this if the matrix process that revised document could not be provided for SC&A to review. We're trying to resolve the issues here, and we stay clear of these site profiles themselves, then that would seem to be the relevant document to produce.

DR. MAURO (by Telephone): The latest version of your white papers, the sequence that came out, I have as dated July 29, 2007. Is there a more recent one that was put out and perhaps I just didn't see it?

DR. NETON: I don't think it was put out. I think --

MR. ROLLINS (by Telephone): It's still in draft form.

DR. MAURO (by Telephone): Okay, the white paper, okay.

MR. ROLLINS (by Telephone): Revised white paper is undergoing reviews simultaneously to the chapter four. We decided to do that to streamline the review process somewhat.

DR. MAURO (by Telephone): Got it. Okay.

DR. WADE: It would still be helpful for that revised white paper to make its way to SC&A.

MR. ROLLINS (by Telephone): I guess that's Mark's call.

MR. ROLFES: Sure, we can certainly provide it. I didn't know if it would be more appropriate though to provide it in the final approved version of the site profile.

DR. NETON: Yeah, I think we need to focus on the process here. And the process is to resolve the Comment Resolution Matrix. And I think if we can resolve it with the white paper level, in my mind I think it works better than getting the site profiles involved in the mixture. I mean, site profiles will ultimately reflect what is resolved at this level, but --

DR. MAURO (by Telephone): Jim, I agree. That worked very, very well on Bethlehem Steel, and the reason why when we were in a way fortunate that there was a sequence of white papers that went back and forth, and we resolved it. And then subsequent to all that, perhaps several months later, was when the revised site profile came out. It was a little clean that way.

And I agree that this is certainly something that the working group would look to guidance for, but if for all intents and purposes your next version of your white paper that you currently have in preparation, if that could be made available, then we could look at that. And that would really, and then, of course, that might end it. We may have some comments on it. But it does make for a nice barrier between the close-out of the matrix issues and not enter into a review of perhaps a chapter or section of a TBD that has undergone major revision. I think it makes it easier for us, too.

DR. NETON: I also strongly suspect that the white papers tend to have a little more

explanatory background information in there about the issues as opposed to the site profile, which might end up being a little more streamlined because of the nature of the document unless it becomes incorporated as a whole appendix. At this point it really doesn't matter, but --

DR. MAURO (by Telephone): So what I'm hearing, and again, I would suggest that perhaps the process for closing out issues involves just a sequence of white papers that are triggered as a result of these work group meetings. And the revisions to the TBD that eventually emerge from the process or during the process, be not part of our review.

In other words, this idea of cycling through white papers seems to be a way in which we could contain the process in a focused way and close out issues that are associated with our original site profile review. I guess I'd look to Mr. Presley and the rest of the working group if that would become a mode of operation that maybe we use not only on this site profile review but others.

MR. PRESLEY: I think that's a good approach.

DR. WADE: It won't always work.

MR. PRESLEY: No.

DR. WADE: Sometime when we talk about the hot particles, I guess, the intellectual content is contained in the page changes; and therefore, they have to look at that.

DR. MAURO (by Telephone): Okay.

DR. WADE: If possible, keeping focus is a good thing.

MR. PRESLEY: So the action item here is Mark's going to give you the copy of the white paper for you all to review on Gene's response to item seven. Is that correct?

DR. MAURO (by Telephone): I think a response to five, six and seven. Am I correct, Gene?

MR. ROLLINS (by Telephone): Yes, that's correct.

MR. PRESLEY: All right, anybody have any questions?

(no response)

COMMENT 8: EXTERNAL DOSE DATA FOR 1963-1966

MR. PRESLEY: Move right on to Comment 8.

The use of 1967 external dose data for ’63 through ’66 is not claimant favorable. And let’s see. The working group has reviewed for completeness, and I don’t see that we need anything on that. Does anybody have any other comments on eight?

DR. MAKHIJANI: I had a question for Mark. This is being incorporated into your revision of the environmental dose. It says here chapter six. Did I miss it?

MR. ROLFES: This also, I believe the chapter six, Rev. 1, page change one, that’s currently in draft. I believe the information may be the coworker dose table that was inserted into there.

MR. ROLLINS (by Telephone): Mark, Mark, this is Gene. Excuse me just a minute. I think this originally related to ambient environmental dose.

MR. PRESLEY: That is correct.

MR. ROLFES: That’s correct.

MR. ROLLINS (by Telephone): And we settled that one because of universal badging. We’re not adding ambient environmental dose to anyone after 1957.

MR. ROLFES: Yes, that's correct.

DR. MAKHIJANI: Because we did not review this item as part of our review because I didn't see that as belonging there. As Gene said, I think this issue is actually resolved.

MR. PRESLEY: Right.

MS. MUNN: It says we were to review it for completeness. As far as I'm concerned it's complete.

COMMENT 9: LACK OF ENVIRONMENTAL EXTERNAL DOSE DATA FOR 1968-1976

MR. PRESLEY: Nine is lack of environmental external dose data for '68 through '76. And that again is part of Response 8 and is complete. It's been taken care of.

COMMENT 10: PRE-1963 EXTERNAL ENVIRONMENTAL DOSE

Ten, the TBD does not provide any guidance for pre-'63 external environmental dose. Issues related to unmonitored workers. And on that, let's see, we said that we were complete with that. Coworker external dose information has been added to the TBD. TBD page changes approved on 1/11/07. To me that would be complete.

DR. MAKHIJANI: This is something we have

not seen.

MR. ROLFES: Okay, we had added a coworker dose table to the -- this is what I was referring to before, the coworker dose table was added to the Technical Basis Document. It was only added up until 1957. Those annual doses were only incorporated until ’57. That has now been extended beyond ’57 as well.

Gene -- and this information is in chapter six, Rev. 1, page change one which is currently in draft and undergoing internal comments.

DR. MAKHIJANI: Right, that’s what I meant. Because there’s been a number of changes in chapter six since we reviewed it, not just that one that we talked about. The page changes in volume six of the site profile don’t only relate to the items two and three that we talked about.

MR. ROLFES: Correct, there are, there are --

DR. MAKHIJANI: There are other page changes, too.

MR. ROLFES: There are other page changes that address some of these other matrix items

as well.

DR. MAKHIJANI: I wasn't aware of that.

MR. ROLFES: And we documented that this particular page change is on page 42 of the revision. So we've specifically identified where the changes are taking place to make it easier to review.

DR. MAKHIJANI: Right, and all I'm saying is that we haven't looked at that.

MS. MUNN: That will be picked up in the review that we --

MR. PRESLEY: It will be picked up in the review?

DR. MAKHIJANI: Well, yeah, if you wish, yes.

MR. CLAWSON: Yes, we need to have that reviewed.

DR. MAKHIJANI: So will you send us all the page changes in chapter six?

MR. ROLFES: They're written in.

MS. MUNN: I think they're all listed here.

MR. ROLFES: Yeah, they're written in.

DR. MAKHIJANI: So when you send them to us you'll send them to us all together.

MR. PRESLEY: Yeah, it's here.

MR. ROLFES: In the response.

MR. PRESLEY: Section 6 --

DR. MAKHIJANI: This is the substance of the page change or?

MR. ROLFES: This information will allow you to find the updated information. So it indicates that the information can be found in Section 6.4.1.1, page 42. As soon as the document is approved, we'll make sure that the page numbers stay the same, and we'll forward that.

DR. MAKHIJANI: All I want to say is that we don't have this PC-1, PC-01 version.

MR. ROLFES: No, no, you do not at this time.

DR. MAKHIJANI: You need to send that to us before. That's all I wanted to say.

MS. MUNN: Hard to review it without having it.

DR. MAKHIJANI: Right, it's not here.

COMMENT 11: CORRECTION FACTORS FOR EXTERNAL ENVIRONMENTAL DOSE

MR. PRESLEY: Comment 11 is correction factors for external environmental dose due to the geometry of organs related to badge and

angular dependence of the dose conversion factors needs to be developed. And the Comment on that was working group reviewed for completeness.

And I think that NIOSH agrees that an assessment of job types may be necessary to determine which ones need correction factors for angular dependence and geometry. A worker category job matrix has been added to the TBD, and it gives this addition at the bottom of that. It has been approved by OCAS on 10/1/07.

MR. ROLFES: That I did send out to the working group members as well. That was the site description, Technical Basis Document of the ^ site profile.

DR. MAKHIJANI: And we have not looked at that.

DR. ROESSLER: Are we adding these pages then to SC&A's assignments, page changes that you mentioned?

MR. PRESLEY: Now this one the page changes are page 35 through 36.

MR. ROLFES: That's part of the external dose TBD which is still -- well, I believe

that information was incorporated in the last go round, and I believe I don't know if SC&A was asked to look at these specific page changes the last time. However, the job matrix issue was addressed in the site description.

DR. MAKHIJANI: I must confess I treated this as part of an environmental dose review and so did not address it as part of the external dose issues. I only went through -- the way I sort of asked our team to work, and the way I put the paper together was I went through all the items that related to external dose and left out all the items that related to internal dose and environmental dose in site description and every other piece of the TBD.

And so I might, it looks like this is, even though it's labeled environmental dose, it is in the, in volume six. So I think we, I'm pretty sure that I missed this because it's labeled environmental dose. I didn't call this out in our white paper as a specific item to review. Yeah, I didn't.

MR. CLAWSON: What you're saying is you need

to be able to look at this?

DR. MAKHIJANI: Well, yeah. Yeah, I guess it was just a screening method. When we're not asked to review the whole document, I used a minimal screening method to go through the document and pull out the items that related external doses that were identified in the matrix. And I restricted pretty much, except, you know, we found some other things while reading the sections and culled them out. But we did not review the, as I said, we did not review the whole document.

MR. PRESLEY: According to the document here this has already been approved.

MS. MUNN: How extensive is that job matrix, Mark?

MR. ROLFES: The job matrix, Gene, could you explain what we put into the site description for the job matrix, please?

MR. ROLLINS (by Telephone): What we did here was we went in and looked at the geometry independence. And we determined that correction factors would be either equal to or less than one. And so there were no corrections that were called for. And that

evaluation is included in the TBD.

MS. MUNN: So is this out?

MR. ROLFES: Well, that's in the external ^.

DR. MAKHIJANI: It's like two different pieces here I think, volume two and there's volume six, neither of which we looked at.

MR. ROLFES: Gene, do you know the specific area where the job matrix is in the site description?

MR. ROLLINS (by Telephone): I'd have to go look that up, Mark.

MR. ROLFES: Okay, I'm looking through right now. Let's see, I do have Attachment C here, NTS Contractor Job Titles and Exposure Potential Review, job title references. This appears to be from page 73 to 78 within the site description.

MR. PRESLEY: Can we go ahead and add those pages to what we want SC&A to look at and let them come back with a comment for those few pages?

DR. MAKHIJANI: Thirty-five, 36?

MR. PRESLEY: It would be under --

MR. ROLFES: This was in regards to the site description.

MR. PRESLEY: Page 77 and 78.

DR. MAKHIJANI: And this other piece in volume six that we did not review, but they were labeled environmental dose. I did not go over them.

MR. PRESLEY: Anybody have a problem with that? Let's go ahead and ask SC&A to look at those pages?

And, Gene?

MR. ROLLINS (by Telephone): Yes.

MR. PRESLEY: This is Bob Presley. If you would, make sure that those are all of the correct pages for that matrix, please, when you get a chance, you or Mark.

MR. ROLFES: In looking through here I did find some additional pages here. It is in Tables C-1, C-2 and C-3 in the site description. C-1 is the REECo job titles that probably had some potential for workplace external or internal exposures. Table C-2 contains information for REECo job titles that possibly had potential for exposures. And C-3 is other contractor job titles with some potential for workplace internal and external exposures. And these are from pages 79

through 83. So there should be some text description surrounding those pages as well.

MR. PRESLEY: Lew, do we have a problem with asking that?

DR. WADE: (Unintelligible).

DR. ROESSLER: You have to have good eyesight to read those tables.

MR. PRESLEY: Has anybody got anything else on this?

DR. MAKHIJANI: Just for clarity, Mr. Presley, the volume six pages 35, 36, 101, 102 as I said, we did not review them even though they are in volume six because this item was labeled environmental dose, and I did not review any item that was labeled environmental dose as part of our review because I was restricted to what I thought covered only external dose for people who were badged or not badged in relation to their occupation. And so we can leave it like that, but I just want to let you know that we did not review those pages.

DR. MAURO (by Telephone): Bob and Lew, this is John Mauro. Again, by way of focusing our activities, it sounds like we have two

different -- right now the strategy that is emerging is that either there's a white paper that's issued that addresses our concerns, or there are particular sections in the TBD that has already been issued, or pages. And it sounds like the pages where these issues might be addressed could be in several locations, or it's about to be addressed in a TBD.

One approach that we could use when we're dealing with the TBD or soon-to-be-issued TBD sounds like SC&A will receive some direction to go forward and review the appropriate portions of the revised or to-be-revised TBD. And one approach would be where NIOSH would simply point out, review these pages and these tables. And then we would, with respect to the issue at hand.

Or alternatively, SC&A could be tasked, please take a look at the TBD and review it with respect to this particular issue. The latter, of course, would be a little bit more open-ended and give us more leeway to take into consideration other material that we might consider to be relevant to the issue at hand. I understand that we

should not go outside of the issue.

Or I can say the other approach where NIOSH would simply identify the pages, and we would limit ourselves to just the review of those pages and those tables. A little guidance there might be helpful.

DR. WADE: Well, you've identified two mechanisms, and I think the work group will be specific in terms of which it's asking you to do on a case-by-case basis, John.

DR. MAURO (by Telephone): Very good, thank you.

MR. PRESLEY: Do you all want them to go back and review the pages one and two of this document or does, you know, this was strictly for an external environmental dose?

(no response)

MR. PRESLEY: Anybody have a comment?

DR. ROESSLER: I'm not sure what you mean by pages one and two. I must have slipped away for a minute.

MR. PRESLEY: Well, there's 101 and 102 -- I'm sorry -- of Attachment B.

MR. CLAWSON: What about 35 through 36?

MR. PRESLEY: Page 35 through 36 also.

MR. CLAWSON: Arjun, have you reviewed any of this information going into --

DR. MAKHIJANI: No. As I said, we went through the whole document but the way I organized what we wrote was according to comment for external occupational dose. So when I organized what our people did, I didn't actually include any environmental dose item in our response in terms of a finding.

MR. CLAWSON: So really, you may have already had a response, but this is new to this section so we do need to look at it.

DR. MAKHIJANI: All of us have read, you know, the people, I asked them to read the documents and so it was a complete review, but I got kind of a miscellany of bullet points back from everybody, and I organized them according to external occupational dose only. And I actually didn't organize some of those points. Some things that were errors, comments I just put at the end as miscellaneous comments for NIOSH, but I didn't do an organized review of those items. It wouldn't be complicated to do it. It's just I didn't organize the review in that way.

MR. PRESLEY: Okay, this is a correction factor issue. To be on the safe side I'm going to say let's go ahead and let SC&A look at these pages, 35, 36 and 101 and 102. If they have a comment on that we would like to have a comment back, please, sir.

MR. ROLFES: I believe that we were asked whether correction factors specific to environmental contamination needed to be developed. So what we did, we did complete calculations to determine whether environmental contamination from a planer surface of contaminated soil would have any difference in effect on the dose conversion factors for specific organs for external dose. And we came up with an analysis that indicated near unity of dose conversion factors. So we didn't feel that it was necessary to have more specific dose conversion factors that are different from what we have in an approved Technical Basis Document, in an approved Implementation Guide, excuse me.

MR. PRESLEY: At this time I'd like to take a break, about 15 minutes. Let's start back at ten 'til. Some of us have to go check out.

We will be back in here at ten ‘til. Is that?

DR. WADE: I’m going to mute the phone until ten ‘til. John Mauro, are you on the line?

(no response)

DR. WADE: John Mauro?

DR. MAURO (by Telephone): Yes, I had to unmute it.

DR. WADE: Would you call my cell phone right now, please?

DR. MAURO (by Telephone): I will.

DR. WADE: Thank you.

I’m going to put you on mute.

(Whereupon, the working group took a break from 10:37 a.m. until 10:55 a.m.)

DR. WADE: Okay, we’re back in session.

COMMENT 12: RADON DOSES IN G-TUNNEL; GRAVEL GERTIE RADON DOSES

MR. PRESLEY: This is Bob Presley. What I’m going to do is start with Comment 12. It has to do with radon doses in G-tunnel are not claimant favorable. Also, it talks about Gravel Gerties and radon doses. If you go down to the response, the Gravel Gerties were only used to test designs for Pantex. They were never continuously occupied. This has

been put to bed.

The working group will review the comments on the TBD when it comes out. As far as the radon dose in the tunnels, let's see, that has been discussed. In fact, we have NIOSH agrees that the -- to issue claimant favorable or higher integrated results has been done. And I think that SC&A has looked at that and concurs.

Is that correct, Arjun?

DR. MAKHIJANI: I believe so.

MR. PRESLEY: All right, and Response 12 can be put to bed.

COMMENT 13: ENVIRONMENTAL DOSES DUE TO I-131 VENTING

Thirteen has to do with the environmental dose due to venting and the working group that will review this as I understand it, Mr. Smith provided results for bounding calculations. And currently OCAS has this under review. Is that correct?

MR. ROLFES: That's correct. ORAU has incorporated some example bounding calculations of radio iodine intakes, and we have incorporated that information into the draft Technical Basis Document, the internal

dose Technical Basis Document, in Section 5.3.3.1 and 5.6.1. This is currently at OCAS undergoing internal comments and so should be released in the near future.

MR. PRESLEY: Okay.

MR. CLAWSON: So that means that, Arjun, you haven't seen that yet.

DR. MAKHIJANI: No. Number two, number four and number five volumes or chapters, I think, are being re-issued, and we haven't seen those yet. Two has been published, but we haven't looked at it.

MR. PRESLEY: Then what we need to make sure is we get you Section 5.3.3.1, page 41, and Section 5.6.1, page 52, for reviewing this matter. Is that correct? Anybody have any comment on that?

MS. MUNN: Sounds right.

MR. PRESLEY: Now, we don't know when these are going to come out. Is that right, Mark? We're still waiting for the OCAS review on this so this is something that may be down the road.

MR. ROLFES: I'll let Gene comment on that. We recently received a draft from ORAU. I

want to say that this is probably being returned back to ORAU with some comments from OCAS.

Gene, have you received OCAS comments on the internal five section of NTS?

MR. ROLLINS (by Telephone): No.

MR. ROLFES: No, you haven't yet, okay.

MR. ROLLINS (by Telephone): No, on the internal, no.

MR. ROLFES: All right, I don't have a timeline.

MR. PRESLEY: Okay, so what we will do is that the up and coming when that comes back, to get those pages. Those page numbers may change if there are additions or deletions. There's a possibility that those pages may change, so, Mark, if you will get the appropriate pages to SC&A.

MR. ROLFES: Correct. I'll make sure that the final page numbers are in fact correct. The section should not change however.

DR. MAKHIJANI: I'd like to just, this isn't the only place where there's a reference to the new TBD, and as I understood from Gene earlier, this is going to be a new TBD,

rewritten. As a matter of procedure when we receive a completely new document to read it to get the context of what is being said. Of course, we restrict the review as we did this time pretty much to the items that are mentioned. Now this is just one item. There are a number of other items so I don't know, this is sort of going back to the beginning in a way whether or not to restrict it just to these pages and then come back at a future meeting to other items or...

MR. PRESLEY: I think that the Board will have to be the person that says that this whole TBD needs to be reviewed.

DR. MAKHIJANI: So for now we'll just do these two sections.

MR. PRESLEY: Is that correct, Lew?

DR. WADE: Correct.

COMMENT 14: INTERNAL DOSE FOR THE PRE-1967

MR. PRESLEY: Response 14, it says that there are no internal monitoring data until the late 1955 or 1956, some plutonium from then on, some tritium from '58, plutonium-tritium mixed fusion products from 1961 and full radionuclide coverage established in

about 1967. It says that the TBD does not provide sufficient guidance for estimating internal dose for the pre-‘67 periods for many radionuclides.

The Comment on this was that guidance will be provided in the TBD, how to interpret in a claimant favorable manner gross fusion products, bioassay results. And this goes back to Comment 5 again which states -- I’m going back to it. Production models, it says that the TBD or the, is in review and will be coming out.

DR. MAKHIJANI: Mr. Presley, only a part of this goes back to Comment 5. A part of this relates to interpretation of bioassay results which is not part of Comment 5.

MR. ROLFES: Correct, and we are preparing guidance that will be addressed in the internal dose TBD on how to interpret the gross ^ fission product activity.

DR. ROESSLER: Is this in Rollins’ white paper or this is...

MR. ROLFES: This is what Arjun is mentioning is slightly separate from the resuspension model or the ambient intakes that

we're referring to.

And, Gene, could you explain a little bit of the difference between some of the updates that we're doing? We agreed to provide some guidance on the interpretation of gross fission product bioassay results in a claimant favorable manner. Now this is a completely separate issue from assigning environmental ambient intakes. Could you elaborate a little bit further on this, please?

MR. ROLLINS (by Telephone): Right, we had guidance outside of the Technical Basis Document guidance to dose reconstructors about how to interpret gross alpha and gross beta bioassay results. And it basically tells the dose reconstructor what radionuclide, beta or alpha emitter, would be the limiting radionuclide for a particular cancer organ. And that information has now been incorporated into chapter five. But that's guidance that we've been using for several years now. We just made it part of the TBD.

MS. MUNN: Do we have a good reference for SC&A as far as page number's concerned on that

particular item on the gross fission product?

MR. ROLFES: Gene, do we have a page number in the internal dose TBD as to where this might be located?

MR. ROLLINS (by Telephone): I'll have to go look that up, Mark.

MR. ROLFES: Okay.

MS. MUNN: Can he get that to Arjun?

MR. ROLFES: Certainly.

The section number also, Gene, if you could look that up while we continue, that would be great.

MR. PRESLEY: Okay, the action item on there is CDC is going to provide to SC&A the page number and a section number to look at on this Response 14.

COMMENT 15: RESUSPENSION OF RADIONUCLIDES

COMMENT 16: USE OF PHOTON DOSE

Response 15 and 16 have to do with resuspension of radionuclides by the blast wave and also use of the photon dose as done by DTRA. Both of these, as I see it, are spelled out in Finding 12, Issue 5.6.3. The working group is waiting to review this for completeness.

Mark, this is a new Technical Basis Document. Is that correct?

MR. ROLFES: Yeah, the Comments, we're going to get an updated white paper to SC&A that has SC&A's comments resolved in that. The internal dose from atmospheric weapons testing time periods is no longer being reconstructed because of the SEC designation. So our white paper, which assigns ambient environmental intakes will only be covering the period from 1963 forward.

DR. ROESSLER: And that white paper is the white paper we discussed before?

MR. ROLFES: Correct, that is Gene Rollins' white paper that has been prepared to assign claimant favorable ambient environmental intakes. We did receive comments from SC&A; however, we haven't updated and we haven't released our responses or incorporation of SC&A's comments into the document.

DR. ROESSLER: So SC&A's specific assignment is when they're looking at this white paper to look at this issue also.

MR. PRESLEY: As I understand it they have already made their comments once.

MR. ROLFES: Yes.

MR. PRESLEY: And CDC has issued their comments back to SC&A or they're getting ready to issue their comments back to SC&A. And what we will get then is a, hopefully, a completed response from this.

Is that correct, Arjun?

DR. MAKHIJANI: I believe so, yeah, John is actually responsible for that.

DR. MAURO (by Telephone): This is John. By way of Mark a little clarification. It was my understanding in Comment 15 says it was focused specifically on resuspension associated with blast wave is now off the table because that would be the portion covered by the SEC. Am I correct in that?

MR. ROLFES: That's correct.

DR. MAURO (by Telephone): Okay, good, so really what we have here now is Comment 16 which could certainly apply to pre- and post-above ground testing. And then what I understand is you will be providing us with page numbers or a white paper that addresses these issues.

MR. ROLFES: For Comment 16 we will not be

using external dose to estimate internal dose as was done by DTRA. That was a separate thing. We sort of skipped over and combined Comments 15 and 16 I guess. But we are not going to be pursuing assigning internal dose based on external dose data.

DR. MAURO (by Telephone): Does that resolve both 15 and 16?

MR. PRESLEY: Yeah.

DR. MAURO (by Telephone): That's what I heard.

DR. ROESSLER: So there's no outstanding issue on either one of those then.

DR. MAKHIJANI: That's correct.

MS. MUNN: Done and done except for our Board.

MR. ROLLINS (by Telephone): Mark, this is Gene. I have a page number for that additional guidance to dose reconstructors.

MR. ROLFES: Okay, this is for Response 14.

MS. MUNN: It is?

MR. ROLLINS (by Telephone): And it's going to be, we added a Section 5.6.3, and it starts on my page 53.

MR. ROLFES: Thank you, Gene.

MR. PRESLEY: Fifteen and 16 are complete.

COMMENT 17: INGESTION DOSES NEED TO BE BETTER EVALUATED

Seventeen has to do with ingestion doses need to be better evaluated. And we have a comment that TBD revision eight-dash-five in draft is currently at OCAS for review. Right now I don't see anything that the working group can do until we get that back for review in pages 49 through 54.

What, Wanda?

MS. MUNN: I was just asking Arjun if we're still on Response 17.

MR. ROLLINS (by Telephone): This is Gene. I'm not sure you're going to find that in chapter five. You're probably going to find it in my revised chapter four.

DR. MAURO (by Telephone): And, Gene, do you basically adopt OTIB-0018 approach in that section? This is John.

MR. ROLLINS (by Telephone): Yeah, what you're going to find in my revised chapter four, I've got an ingestion model where we're having the workers ingest 100 milligrams per day.

DR. MAURO (by Telephone): Okay, so you're

not going with the OTIB-0018 approach.

MR. ROLLINS (by Telephone): No, let me finish. That's for the above ground workers. And what I have proposed to do for the below ground workers is to provide them with that ingestion dose as well as ten percent of OTIB-0018 maximum values.

DR. MAURO (by Telephone): Okay.

MR. ROLLINS (by Telephone): So that's why, I'm attempting to provide a reasonable upper bound on what they could have possibly ingested.

DR. MAURO (by Telephone): I hear.

COMMENT 18: OTIB-0002 FOR POST-1971 TUNNEL RE-ENTRY WORKERS

MR. PRESLEY: Gene, this is Bob Presley. Then that would take in Response 17 and also Response 18 for the tunnel re-entry workers. Is that going to be in that same section?

MR. ROLLINS (by Telephone): Well, what we're finding is the early re-entry and recovery individuals typically were required to wear respiratory protection. And this OTIB-0018 approach is only going to be used for those individuals who worked underground

who did not have any bioassay data. And so most of the recovery and re-entry people we can reconstruct their internal based on their actual bioassay data. And that's always preferable.

MR. CLAWSON: Isn't 18 a little bit different though?

DR. MAKHIJANI: That's what he just said.

MR. PRESLEY: Yeah, that's what he just said. That it is different. It has to do --

MS. MUNN: And that would only apply to a portion of that.

MR. ROLLINS (by Telephone): Originally, 18, I believe as I remember this, was there was the allowance for using OTIB-0002 during certain time periods, but there was not guidance provided as to when it would not be appropriate to use OTIB-0002. And that guidance has been added to chapter five.

DR. MAKHIJANI: Now I'm confused. Are we talking about two or 18?

MR. ROLLINS (by Telephone): This one's talking about two.

MR. ROLFES: He's talking about Comment 18.

MR. PRESLEY: Well, wait a minute --

MR. ROLLINS (by Telephone): OTIB-0002.

MR. PRESLEY: -- Gene, wait just a minute. Seventeen as I see it is complete. We're waiting for the OCAS review, and when that happens then we will give SC&A pages 49 through 54.

Now, 18 has to do with the tunnel re-entry group --

DR. MAKHIJANI: Mr. Presley, before you go on. He said he has changed all that and it's in a different volume altogether. So I thought that's what Gene just said that Response 17 is no longer, this section is no longer dealing with Response 17. It's some place else.

MR. ROLLINS (by Telephone): Right. The incidental ingestion issue is going to be discussed in chapter four.

MS. MUNN: In the revision it will be in chapter four.

MR. ROLLINS (by Telephone): Which is currently under review.

DR. MAKHIJANI: And so presumably there's a section that you'll send us along? Is that what you meant, Mr. Presley? That we should

review the whatever section that is?

MR. PRESLEY: Yes. If it's in Section 4, then we need to get you the pages from Section 4 that pertain to Response 17 for review, whatever they be.

MS. MUNN: And can we take out that reference to OTIB-0018 now then because I think we just heard how OTIB-0018 is going to be used. So we did review 18.

DR. MAKHIJANI: Yeah, I've noted that this is different than 18 in my matrix.

MR. ROLLINS (by Telephone): Now Comment 18 as I remember -- and this goes back along ways, but what was going on there, there was a specific statement in OTIB-0002 that it would not be used for underground workers. And that limitation was not specifically in chapter five of the NTS TBD. And we have subsequently added that just to assure the dose reconstructors would not use OTIB-0002 for underground workers.

MS. MUNN: And that was the page 53 change referred to, right?

MR. ROLLINS (by Telephone): I think that change has been in there before the latest

page change.

DR. MAKHIJANI: I think that this has been resolved some time back because NIOSH agreed to this some time back, and I don't think there should be anything to review here.

MR. PRESLEY: Okay, so under 17 there's nothing to review.

DR. MAKHIJANI: Eighteen.

MR. PRESLEY: Or 18?

MS. MUNN: Eighteen is done except for --

MR. CLAWSON: So, Arjun, just so I'm clear on this, what you're telling us is the section of OTIB-0002, you reviewed that where they took out excluding it from underground workers?

DR. MAKHIJANI: No, Brad, what it said in OTIB-0002 is that it should not be used for Nevada Test Site underground workers, and the first, revision zero, of the NTS site profile allowed it to be used for underground workers even though it wasn't meant to be used. And now that restriction has been placed that OTIB-0002 should not be used at Nevada Test Site, and they've made that guidance to dose reconstructors clear. So that issue is just

resolved.

MR. CLAWSON: I apologize. I'm just a little hard to follow.

DR. MAKHIJANI: No, lots of procedures.

MR. PRESLEY: All right, 18's complete.

COMMENT 19: PRE-1966 BETA DOSE

Let's go on to 19. If you would, go back to your six-page matrix, please. Nineteen has to do with beta dose data, and Arjun, do you want to speak about this Comment there? And then we can go from there.

DR. MAKHIJANI: Our original comment had been that there had been no measurements of beta dose before 1966, and a good bit of our review that we submitted to you was for the material that NIOSH had added to estimate beta dose before 1966. They added three different -- their basic approach was to calculate the ratio of, an estimated ratio of beta dose to photon dose.

And photon dose was measured, and they had three different models for that: immersion in a cloud with beta- and photon-emitting particles, surface contamination with beta and photon particles and exposure to a

point source. And we had different comments on each of these. Overall, it was a very substantial and detailed response to our comment with a lot of calculations just as a caveat. It was a very lengthy and involved process that NIOSH undertook.

We did not try to reproduce the calculations as part of this review. We responded, our comments are sort of restricted to the methodology and not to the numbers because trying to reproduce the numbers would have been very time consuming and cumbersome, and we thought that you should direct us to do that if you wanted us to do it.

So in some places we agreed with the NIOSH methodology that called out the summary, let me read the summary into the record so that it's there. Let me find it. Here's the summary that we provided in our review. Status of beta dose for 1966. ORAU Team 2007 does not provide an appropriate modification of Hicks' tables for tower and surface shots.

With this limitation ORAU Team provides a considerable analysis and in some cases a claimant favorable approach to

estimating some beta doses for unmonitored personnel. However, a number of issues remain to be addressed even when the dose estimation approach appears to be reasonable.

A validation of the ratios using post-1966 data was not reported in ORAU Team 2007 -- that is the volume six revised external dose document -- so validation of the ratios using post-1966 data was not reported and apparently has not been done. For skin doses up to 1966, issue of dose reconstruction still remains essentially unresolved.

And here we agree with NIOSH, that there are no measurements. It's essentially impossible to reconstruct dose, and NIOSH has acknowledged this.

And NIOSH acknowledges that, quote, without recorded contamination levels, skin dose is virtually impossible to determine. Hence, pre-1966 dose issue is unresolved.

And so that's sort of a summary of it. It's quite an involved review. I can go through some of the highlights. One of the procedural comments was that the Hicks' tables were developed for offsite and need to be

modified. The surface contamination beta-to-photon dose ratio would not be claimant favorable for exposures at less than 120 centimeters. Especially, they would not be claimant favorable when jobs that involved sitting or being closer to the surface than 120 centimeters were involved.

And we also found that the efficiency ratio of three-to-five, which is sort of less than some of the ratios mentioned, was not well justified and could be used on dose calculations but not for maximum or best estimate doses. For the immersion dose we found generally the beta-to-gamma ratios to be claimant favorable. There are quite a lot of involved calculations, and we didn't verify them, with the caveat that they can't be reliably applied to skin doses, but otherwise we found the immersion dose ratios to be appropriate.

And the other operational areas involved point sources, and there there's a one meter distance to which this has been calibrated, and we found that that was not always claimant favorable. Especially,

there's a 30 centimeter standard working distance for the length of the human form and so perhaps a bigger photon ratio for that range needs to be calculated.

I think that sort of covers the broad outlines of our review. But there are many other details including six bullet points that are on page seven of our review that provide some comments on Attachment C that I can go through if you like, but they're there for you to look at.

MR. ROLFES: Significant beta doses are going to be associated primarily with exposure to fresh fission products in immersion in fission products. And these are typically associated with incidents or acute exposures. Anyway, the typical exposures usually involve gamma exposures at Nevada Test Site.

In order to specifically address the beta-to-gamma ratio we reviewed approximately 200 external dosimetry files. And I'm going to read from this. I just got this. I apologize. I guess I just got it the night before last and haven't had the opportunity to pass it on to the working group members.

We reviewed approximately 200 external dosimetry files. They were examined for positive neutron, beta and gamma results. Of the 200 claimant files that we reviewed, only one positive neutron result for one individual was located. But specific to the individuals that were monitored for beta and gamma exposures post-1966, what -- I'll just read this here.

Twenty-three of the 200 claimant external dosimetry files contained a total of 140 positive beta for shallow dose results. What was readily apparent from the review is that even that when there were positive beta results in a file, they were not the norm. There were a total of 256 positive photon results for the years in which positive beta results were located.

The most common situation was a preponderance of non-positive results with several positive beta results usually associated with these positive photon results. These results were analyzed in order to identify an associated beta-to-photon ratio.

The beta-to-photon ratios, which were

based on annual external dosimetry totals for the years in which positive beta results were available -- this was the post-’66 and after 1966 -- a review of the 50 annual ratios found 25 of these ratios to be less than one-to-one. Another 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. The largest annual beta-to-photon ratio was 4.1-to-one.

I think this will reinforce and demonstrate that our beta-to-gamma ratios that we’re assigning are, indeed, claimant favorable.

DR. MAKHIJANI: If I may just comment, I neglected to ask, I’ve invited Lynn Anspaugh to join. I don’t know if he did. And I know Joe is on the line and helped us with this.

Joe and Lynn, did I do justice to your work or did I skip anything?

DR. ANSPAUGH (by Telephone): Well, this is Lynn. I think you’ve done fine.

MR. ZLOTNICKI (by Telephone): This is Joe. I think one issue with the post-’66 data is I had noted that the film badge for a variety of

reasons, if there were lower energy betas around, say -- it's very had to put an exact number on it, but say less than 500 keV betas. They will have been likely missed or severely under reported post-'66 so that using this ratio method would underestimate those lower energy betas.

All the lower energy components, depending upon the calibration method, whether or not field calibration was used for those energies and so on. So I think in general what was described by going back and looking in the record sounds impressive, but I would put that caveat there that the badge had a fairly thick wrapper as best I can tell and may have been in a bag most of the time and so was actually missing betas post-'66. So that needs to be considered.

MS. MUNN: Excuse me, I'm a slow learner, and sometimes when I hear things like that I have a problem grasping exactly the full meaning of what's being said. What you're telling me, I think, is that the badge readings are no good, and we can just throw them out on the assumption that they were

never adequate to begin with. Is that what I heard?

MR. ZLOTNICKI (by Telephone): I hope you didn't hear that, but maybe you did. No, I wouldn't go that far. I would say that for high energy betas the badge is going to detect them well and was presumably calibrated for those betas. But for the component of beta that was lower energy, the betas never penetrated the badge even though they could penetrate through the skin to the depth that could cause damage.

So the problem is how are those low energy betas addressed. And that's really the question. And in an intermediate range it can be addressed with the calibration system, but at some lower energies, you just don't see them at all. And so I can't begin to say where on the site lower energy betas would have been an issue other than to say I would imagine there were places where that was an issue.

But I'm not the person to speak to those, the exact fields, only to the fact that the badge had a fairly thick coating on it and

would have missed any low energy betas anyway. So one can't just hand one's hat on the ratio and simply say, well, we're okay because the post-'66 ratio never exceeded 4.1-to-one.

MS. MUNN: Well, I'm having a hard time with the fact that we understand what fission products are, and we understand what the emissions are from those fission products. And why we would, therefore, assume that there is a slew of low energy betas that weren't being measured somewhere, I can't make the connection in my mind.

MR. ROLFES: The average beta particle energy -- excuse me -- we're talking about beta particles that are in excess of 500 keV from fission products where the significant beta doses could occur. So we really don't have evidence to indicate that there were significant low energy beta exposures at the Test Site.

MS. MUNN: I guess that was my point.

DR. ROESSLER: What energy did you mention? I didn't get that.

MR. ROLFES: Five hundred keV would be everything --

DR. ROESSLER: So less than, he's concerned about the ones less than --

MR. ROLFES: He's concerned about less than 500 keV; however, fission product beta activities for -- excuse me -- beta energies are typically in excess of 500 keV. For example, Strontium-90 is 3 meV, yeah, 3 meV beta particle. So the average energy for that would be 1 meV. It would be a third of the maximum. So fission products are going to typically have high energies.

DR. MAURO (by Telephone): Mark, this is John. As I understand it is your initial approach -- and I did read our report, and what I'm hearing is that you had a theoretical approach for these three different exposure scenarios as described by Arjun earlier.

And am I correct that the models that were used to come up with the ratios were based on understanding what the fission product mix is as a function of time. And therefore, knowing -- and the activation products. Therefore, knowing that mix, and of course, knowing the decay scheme of all those radionuclides, you're in a position to come up

with what you think theoretically, not by measurement, but theoretically, what would be the relationship between photon exposure and beta exposure as a function of time and distance from the source.

Now what I'm hearing though is that in order to confirm that your theoretical models were reasonable, if not bounding, you also took a look at some post-1966 real-life data to see what the ratios actually were. And you found that your models, at least when you compared to that dataset, were claimant favorable.

But as Joe pointed out, there's certainly some limitations for those models in that they're not going to capture some of the low energy beta. But I assume in your theoretical models the low energy beta was captured. Did I ask a question that's tractable?

MR. ROLFES: Yeah, I certainly think it's tractable, and I think we can take a look at some of the refractory radionuclides in order to demonstrate our approach.

DR. MAURO (by Telephone): Yeah, so in a way

what I'm hearing is that the post-'67 empirical data, the real data, I mean, it's information. It gives you some information. It has certain limitations. And the issues that we raise in our report regarding the loss of the refractory materials, I mean, you might be enriched in more refractory materials close to the site.

And, of course, this business of the distance to between the receptor and the source might have an effect on some of the ratios you selected. I guess our concern would be to be sure that the ratios that you have selected are reasonably bounding if you were to explicitly consider the refractory radionuclides at perhaps somewhat closer distances.

MR. ROLFES: So, Gene Rollins, do you have anything to add? Can you make any comments about looking into the refractory radionuclide dataset, I guess, and determine if there's any significant exposure potentials from lower energy beta emitters that we have not accounted for?

MR. ROLLINS (by Telephone): Yes, we're

going to go back into the original spreadsheets and add the refractories back in. We just didn't have time to do that before this meeting.

DR. MAKHIJANI: Just a couple of comments. The places where some of the beta-to-gamma ratios might be important, some of the higher ones, and the time dependency might be important. Actually, first let me say that I appreciate the post-1966 verification which are the comments that we had raised that should be done, and you've done it. So that's a good thing, and that provides some level of assurance that many of the numbers are claimant favorable. And we'd actually judged many of the numbers to be claimant favorable so that issue, I think, is pretty close to being resolved. I think there's some fine print there, but the question of how you can back extrapolate is a little bit complicated because of the badge question that Joe mentioned, the time dependence and that fact that the beta-to-gamma ratios may become very important when a person is actually caught in some kind of incident of cloud as happened,

for instance, with Baneberry or in some other incidents. We've actually compiled a lot of those incidents in a different report that we sent Jim Melius under the 250-day SEC considerations. There's quite a lot of data from actual claimants for circumstances like that. And that's where the, sort of the average ratios over a period of years, numbers of zeros and so on, may not be so relevant. And back extrapolating to pre-'66 might be a little bit complicated, not that it couldn't be done, but I think it would need to be done at some, the validation would still need to be done.

DR. ROESSLER: I have a question, it's really of Arjun, I guess. If you can identify the radionuclides that were pertinent, and if you can show that there are none in that range where the betas were too low to go through the badge and high enough to be biologically significant, does that remove the question, the whole question here? Or is that just part of it?

MR. ROLFES: Well, I think we're going to go back and look at the population of refractory

radionuclides and add that back in to determine whether it would, to determine whether we would need to assign any correction factors essentially or increase a beta-gamma ratio.

Does that answer your question?

DR. ROESSLER: Well, Arjun didn't say anything but --

DR. MAKHIJANI: I didn't know there was a real question for me. I mean, we --

DR. ROESSLER: I'm just asking if Joe's concern is resolved, does that resolve all of your concerns?

DR. MAKHIJANI: I haven't actually -- Lynn might better address this than me because he's more familiar with radionuclide mixtures. Well, I haven't recently looked at the beta energies over time for how the mix of energies actually evolved. And NIOSH has used the Hicks' tables and the beta energies would be in them. And as I say, we haven't gone into those calculations and tried to verify them. So it's not on the tip of my mind, and so I can't really comment on it. I don't know.

Lynn, do you have a ready answer to --

DR. ANSPAUGH (by Telephone): Well, let me make a couple comments. One is, of course, you do have to add back the refractories, but that's not enough. You have to add back more than the normal amount of refractories because they did fall out on the Test Site and never made it offsite. So renormalizing the Hicks' tables is not a trivial job, and I don't know if that's been figured out or not.

I think in answer to Gen's question it should resolve it. The only thing that makes me a little nervous is, of course, any time you have a beta emission, you have a full range of energies, all the way from zero up to the max. And I doubt that that would be an important issue, but I just don't know without doing some calculations.

MS. MUNN: But if we have good records with respect to all of the incidents involved, and we have decent records as to who was involved, then it's difficult to understand why these more esoteric issues are broadly applicable.

DR. MAKHIJANI: Because there were no beta dose measurements made until 1966 even though they wore badges, so you have to find some way

to calculate it. There was some routine beta dose exposure, some immersion, some surface, you know, all the models that NIOSH has put forth, and so there's both routine and non-routine exposure that needs to be accounted for as best I understand it.

And I was just cautioning in regard to back extrapolation that you have to pay special attention to incidents, not that that's the only exposure involved. When there's no measurements, you have to find some --

MS. MUNN: We do have a plethora of information about the incidents.

MR. ROLFES: I mean, the information that we've reviewed, the 200 files that we reviewed, included those that received the highest exposures onsite. So once again, the highest, they did a photon ratio that we saw from '66 forward was 4.1 to 1. So this time period there were incidents that occurred in this time period that exposures to fresh fission products. There were certainly similar exposures in the post-1966, for the 1966 and later period similar to those that

occurred in the earlier time period. So, Gene, do you have anything to add to what I have stated?

MR. ROLLINS (by Telephone): No, I don't believe so, Mark. Is it possible to see this review?

MR. ROLFES: Is it possible to see it? Sure, we can put something together I believe.

DR. MAKHIJANI: Lew, is it useful to think about looking at the beta-photon data, the photon ratios for the Baneberry incident? I presume that many or most or all of those people were monitored.

MR. ROLFES: Those were incorporated in this review so like I said, we took the highest exposures that were recorded.

DR. MAKHIJANI: So we'll find that in your review.

DR. ANSPAUGH (by Telephone): One question about these 200 cases you reviewed. Were they claimants or were they the highest of the whole population?

MR. ROLFES: These are the highest of our claimant population. You know, I would probably have to clarify with the person, like

I said, I haven't had too much time to -- I don't know, well, let me ask, is Carol Smith on the phone?

(no response)

MR. ROLFES: Okay, I would probably have to get clarification because we had gone through the top 100 highest exposures, external exposures at Nevada Test Site, and then we had also expanded our review. But these are only for what we have in our claimant population. These are not from the entire site. These were only from our claimant populations.

DR. ANSPAUGH (by Telephone): Okay, well I think you have a serious question of whether or not the claimants are representative of the entire population.

MR. ROLFES: One would expect that there would be, so given our sample size we think that it should be representative.

DR. ANSPAUGH (by Telephone): I would very much like to see this review.

MR. ROLFES: Okay, we can see if we can get something.

DR. MAKHIJANI: This was evidently done in response to one of our comments so I really

appreciate that.

MR. ROLFES: Sure.

MR. PRESLEY: The action item here is SC&A and NIOSH are going to work out the wording. And who's going to get something back on Comment 19? You know, we had this in our last go around that the TBD and the work was completed and the working group will review for completeness. Again, this is the one that I thought that we had taken care of. Can we get a response from SC&A and NIOSH as to where we stand? Is this going to be completed or do we need to do something else with Response 19?

DR. MAKHIJANI: I'm a little bit unclear as to what's being asked. I mean, we reviewed the TBD to the extent that the new materials were there after the, and we agreed with some things and didn't agree with other things as specified. Afterwards NIOSH has prepared some new materials that we haven't seen and so there are some outstanding issues, certainly less than there were before. We'd be happy to review the compilation but other than that, I don't know what, I'm not clear on what we're being asked to do.

MR. PRESLEY: Are you all ^ for a copy of the --

DR. MAKHIJANI: That's right. I mean, we can certainly review that.

MR. ROLFES: Yeah, as soon as we get a formal review put together, this was just a summarization of what was done. I'll have to ask for some more formal documentation of the review in order to release it for SC&A's review.

DR. MAKHIJANI: Well, what the other -- sorry.

MR. CLAWSON: What type of form will this be coming in? Is this just a, will this be kind of like a white paper, just -- I apologize. I'm just curious which way the form is going to come to SC&A.

MR. ROLFES: Probably in a white paper would be the best format.

DR. MAKHIJANI: The only other thing I can think of is Gene was saying that they're going to review the question of refractory to the modification of the Hicks' tables, and Lynn opined that this would be a complex matter, and I don't know, there's nothing on the table

for us at the present so far as I can see.

MR. CLAWSON: It'd be complicated to actually get it done.

MR. PRESLEY: When you start changing the Hicks' tables --

DR. MAKHIJANI: That's right.

MR. ROLLINS (by Telephone): This is Gene. It might be helpful if Dr. Anspaugh could suggest a methodology that would be acceptable to the Board to add these refractories back in, and that way we don't have to keep going around in circles.

DR. ANSPAUGH (by Telephone): You know, I certainly can do that if the Board would like me to.

MS. MUNN: What kind of methodology do you have in mind, Gene? Lynn, sorry.

DR. ANSPAUGH (by Telephone): Well, the Hicks' tables are not just a table of radionuclides, they're a table of radionuclides such that they're normalized to external gamma exposure rate.

MS. MUNN: Yes.

DR. ANSPAUGH (by Telephone): And this is the complication because every radionuclide

has a different conversion factor.

MS. MUNN: Yes.

DR. ANSPAUGH (by Telephone): And so if you want to put the refractories back in, it's fine. You put them back in and then you have to re-normalize the table again. And then if you want to add in the refractories that were dropped out, then you have to go through a process to add the refractories in to account for that. And then you have to re-normalize again to external gamma exposure rate.

DR. MAURO (by Telephone): Lynn, this is John. I was involved in looking at some of this Hicks' tables for some of the tests out in the Pacific. And I recall the lookup tables that were produced, the so-called Hicks' tables. They often, they always gave you the mix of radionuclides with varying degrees of refractory material coming out. So there was like one set of tables would be zero whereby, where they did not take into consideration that refractory material came out. Another set of tables where there was a certain percentage and then a greater percentage, usually were three.

So what I was thinking that could be done was that if the table that you're using, that NIOSH is using, currently basically are built around offsite doses, that would mean that they probably are using tables where there was this -- I forget -- ten percent. I forget how they did the metric, but where the refractories came out. But the very same place where they got those tables probably also have the ones with no refractories out.

DR. ANSPAUGH (by Telephone): Well, unfortunately, John, that's not true.

DR. MAURO (by Telephone): Oh, okay, because I know I've seen that with several of the tests in the Pacific. I wasn't sure whether the tests are here also.

DR. ANSPAUGH (by Telephone): Well, Harry Hicks, bless his soul, when he was alive, he only did that for a few cases because there were special requests and the Pacific being one of them.

DR. MAURO (by Telephone): I see.

DR. ANSPAUGH (by Telephone): And, of course, Harry -- well, we were concerned about offsite doses. We weren't concerned about

onsite doses. For onsite doses you have to allow for the fact that there's an excess amount of refractories onsite.

DR. NETON: This is Jim Neton. I might suggest this seems like one of these issues that would benefit from a side technical exchange between NIOSH and SC&A including Lynn Anspaugh that we can arrange to discuss and iron out our differences and commonalities on this issue. It sounds like, you know, it's benefited us in the past to sit down and have the right technical people sit down and have a brief, you know, half hour, hour conversation and get the path forward going on this.

MR. PRESLEY: This is Bob Presley. Jim, can you get that going and then you or Mark, Mark in the working group a short synopsis of the findings on what we have here. And once we iron this out with SC&A and you all then, we have you all's comment back on this one way or the other I think it would satisfy this Comment.

DR. NETON: Mark, is that all right?

MR. ROLFES: Certainly, we can set something up.

MR. CLAWSON: But also kind of the path forward that we're going.

DR. NETON: I think that technical exchange could really go a long way.

MR. PRESLEY: You start changing those old records and things like that as I understand that's going to change everything.

DR. MAURO (by Telephone): I think the key issue here is we might not be able to be, if it turns out it is a difficult challenge to get the refractories back in, there may be a way -- and I'd like to be involved in this because there may be a way to address the issue that's at hand. That is, if you were to, let's say we find that we might have some difficulties doing a precise reconstruction of what the refractories' contribution would be, we might be able to ask ourselves the question; however, does that change the beta-to-photon ratios or is the potential there to create, to change the beta-to-photon ratios to such an extent that it would invalidate the default ratios that have already been adopted. So I don't know whether or not we really have to solve the problem explicitly, but just

solve it to the degree that gives us a level of assurance that the ratios adopted were, in fact, appropriately bounding.

DR. MAKHIJANI: John, I mean, that can be part of the agenda though. You and Lynn and Jim and whoever from the ORAU side could be involved in this.

MR. PRESLEY: Can we get this completed in a timely manner and get it back to the Board, please, in the next two or three weeks?

DR. NETON: We can certainly try.

MR. PRESLEY: All right, that takes care of 19. We have an action item for SC&A and the CDC to work out a mutual response to Comment 19 and get back to the Board.

COMMENT 20: INTENTIONAL NON-USE OF BADGES

Comment 20 is the revised TBD provides no evidence that the issue on non-use of badges was actually investigated. And I'm going to let -- Arjun, do you have anything to say on this?

DR. MAKHIJANI: This was maybe the most difficult part of the review for us and for me because, well, not only has the question of are there real criteria for when you're going

to accept site expert evidence and when you're not, but because of a particular exchange that occurred at Rocky Flats that I felt at the time was rather problematic and called at least the attention of some people at the time to it, which is at Rocky Flats there were written documents from the time that said thorium strikes were done in Building 71.

And NIOSH said we have a site expert who remembers today that 30 years ago thorium strikes were done in Building 81. And the document should be disregarded even though it was a document from the time because it was written by an investigation team that wasn't actually doing the work. So there we have a case where NIOSH's statement was that site expert evidence should be accepted even though it's a 40-year memory over and above an official classified investigation that was done three weeks after the event in question.

And I felt very uncomfortable that this was being proposed. I didn't say anything about it because it wasn't particularly appropriate at the time other than in private. But I have said from the

beginning in this case that the person who was hired as the principal Health Physicist had been very, very clear -- unfortunately, he has passed on -- his interview was very clearly documented.

This is also supported by worker evidence. It is supported by hazard pay policies. There's been many presentations or several presentations to the Board by claimants and their families that this, there was not a policy of non-use of badges, but the pay policies and other pressures of work seemed to encourage this. There's been a substantial amount of uncontradicted evidence that there was a practice of non-use of badges even though it was clearly not approved, people were required to wear their badges.

That's not the question. And we, I find it quite hard at this time given what has transpired that NIOSH's position seems to be that because it was the policy, somehow the site expert evidence, even though uncontradicted by documents other than it was policy. Nobody's disputing that it was policy to wear the badge.

This is a rather problematic thing, and it would be very helpful to have some guidance as to when you accept site expert evidence, and when you don't because this issue is going to keep coming up. And it has come up not only on the part of SC&A, it has come up on the part of many presentations that we've made to the Board. And it has come up in other contexts in terms of how site expert and worker evidence is being treated.

DR. NETON: I don't see anything in this response that says that they did not accept the idea the badges weren't worn. I don't see anywhere where it says that in here.

DR. MAKHIJANI: To me I read it as a rejection of the idea that it was a systemic problem until the mid-'60s.

DR. NETON: Well now that's different. Whether it's a systemic, prevalence is the issue, not whether they were worn or not.

I don't see your argument carries any water that we flatly rejected the testimony or the assertion of a Health Physicist that badges weren't worn. I think we accept that. I think it's just a matter now what is the

prevalence. How prevalent was it, and was it sufficiently prevalent to invalidate any potential coworker model that could be developed. I think that's the real issue here.

DR. MAKHIJANI: Well, it's not just a question of coworker models, it's a question of the validity of the individual data themselves because if the workers were taking off their badges, then how valid are the individual dose --

DR. NETON: That's my point. That's why I said it's an issue of prevalence. If it's one or two isolated instances, and we have a large cadre of data, are those isolated instances sufficient to invalidate at least the coworker models because we would essentially treat those individuals as unmonitored.

If it could be established those people were not monitored, then we would just assume that they didn't have any monitoring and apply a coworker model, then it gets down to prevalence. And I don't know how much documented evidence in terms of the NTS we have if this was a rampant issue.

The one expert that we interviewed told us that in the forward areas it was pretty prevalent. I don't, you know, no one has put a number to it, so many percent, so many times, and I don't know that that can be done. In the beginning when this issue first came up, I believe maybe in the very first meeting, NIOSH proposed to do a statistical task in terms of review of claimant data. I don't know that that's ever been done.

MR. ELLIOTT: I think it was suggested. You all suggested or proposed it, but we pointed to our rule language that indicates how we validate data. We validate it based on trend analysis.

DR. MAKHIJANI: In any case, so far as we have been able to determine this wasn't just an isolated, there's evidence that this wasn't just an isolated thing to be treated in an isolated manner. And the way I read the TBD, and it was reviewed internally, this is being treated as if it is an isolated case here and there that can be dealt with by individual and claimant file examination. That's an issue obviously that the Board --

MR. PRESLEY: My stand on this is, you know, we have talked about this at Rocky Flats and talked and talked and talked. We still don't have a firm agreement one way or the other. Yes, there are isolated issues. I think everybody agrees to that, but that's at Rocky Flats. This is at NTS.

From my own personal experience at NTS, you wore your badge. You didn't just get checked at the gate when you came in in the morning. There was a guard at the sites where you went in, and it was beat into your head that you wore that badge. And if somebody noticed you'd either dropped the badge, or you didn't have a badge on, then somebody questioned you at that point as to why you were there.

You didn't have your badge on, you were in trouble. It was a Security issue. And the problem with the people not wearing their badges, my main point is that it may be an isolated case, but I don't think it was anywhere near a large number of people.

MR. ROLFES: Based on the additional interview that we did, there was also

information that he had heard this, that there were various stories about this practice, about people intentionally exposing their badges as well as intentionally leaving their badges, you know, in a place where it wouldn't be exposed. And he said that he was never able to confirm that the practice existed in fact.

He had never seen any definitive proof of it, but it was more hearsay that he had heard of stories that were, in fact, you know, stories that were passed on between workers. We know that, for a fact, that it was certainly a serious security infraction if you were caught without a badge.

But the point is whether the practice occurred or not, it was not condoned by management or required by management. We do, in fact, have the methodology, the coworker dose information that we can use to reconstruct doses on a case-by-case basis.

MR. CHEW: I would like to add, too, Arjun, in working with the construction chapter we obviously looked at dosimetry records. Let's take a look at the reasons here. The reason

for taking off your badge and not wearing your badge is that you might think you were coming up to a regulatory limit.

And we really look at the doses that were involved. The actual data didn't even come close to that, you know, at the Nevada Test Site. If five rem was the limit, if you were receiving about one or two, because we have a large database of that, so there's really no reason for the people to take off the badge.

If you were coming close to the regulatory limit, if you were working, and you wanted to continue working because you were reaching the regulatory limit, then, yeah, maybe some issues of either management or yourself would like to continue to work would allow you to continue to work. There's really no evidence to support that.

MR. CLAWSON: I'd like to be able to say something, too, because when we went to the Nevada Test Site with our family, we had an extremely interesting tour. The person that was with was very, very good, very, very knowledgeable, no problems with any of them.

He was asked this exact question. And his comment was, no, it was not condoned, but the workforce looked at as if they were apart the war, too.

And in his comment, he made the comment and said, I would never let a badge get between me and getting this accomplished period, and that's all I'm going to say. Because from that standpoint, too, is that they did, it was drilled into them that they could not, don't do your badges. You've got to have your badges and everything else like that, and this is a conscious decision and so forth.

But his comment of I will not allow a badge to get in my way of completing or finishing this. Because, you're right, the regulatory limits or the weekly limits or whatever like that because I can tell you today, and it's by their choice, that some people are doing these things, construction side, our side, because basically to be able to bring finish to a lot of jobs that for people to go in and start up where they've left off, they would receive just as much

doses as what this person has.

There's a lot of aspects to this, and I just, I agree on both sides of this. I'm just, it seems like every once in awhile we bounce back and forth that we are taking documentation that, okay, we're going to take documentation this time, but now over here we're going to use area experts and back and forth. These can't be bypassed or sidestepped, and we need to really look at this because this is not just on NTS. This is on every site.

DR. ANSPAUGH (by Telephone): This is Lynn Anspaugh. I'd like to say a few words about this. First of all I never saw anybody not wear his badge, but I was kind of late on the scene. But when I had a badge, I frequently took it apart just to look at it, and you can very easily take your film badge out of that badge or your TLD or whatever, and put it someplace else so you don't have a Security problem.

The other thing is I think there were certain periods of time and certain groups of workers who may have felt the need to do this,

and that would have gone back to a period of time when there was really an intense push to finish a lot of tests in a short period of time. We felt we were in a major confrontation, competition with the Soviets. And I think if you go back and look at this anecdotal data, you'll find that there are only a few classes of workers where this really was likely to have been an issue.

One was the Rad Safe workers who were on the re-entry teams. Another one was the tunnel workers who were being pushed very, very hard to get ready for the next test, and it was very clear to these people that if they went over the limit, they got laid off and maybe they didn't get to work for a long period of time. So I think you really could narrow down this problem.

DR. MAKHIJANI: Just a couple things, the site expert interview we have, just to address what Mr. Presley was saying, is he felt that this problem stopped around the time that the joint security badge, film badge was issued in 1966.

By that time it was largely stopped

because, for the reason you said, presumably for the reason that you said. People would have found it difficult to be onsite without their security badge, but before that time it was possible to have your security and not have your film badge. And that would also correspond to what Lynn was saying.

To my memory, and this is obviously my memory deference to Mark's comment yesterday, but the comments that the Board has received, and what we have seen to this effect are in these groups of workers including in the interview that I did where the person himself said that he had done it himself even though. He was part of the Rad Safe team, and through the clouds, you know, measuring radioactivity and so on. So he was in the front line for a good period of time. And we've also heard this from tunnel workers. So I think it may be possible to focus this issue on those groups of workers that were involved and on a certain time period.

MR. PRESLEY: Anybody got a path forward?

MS. MUNN: ^

MR. CLAWSON: Did you say none?

MS. MUNN: ^

MR. PRESLEY: Let's decide what we're going to do here on this one.

DR. WADE: Well, if you take Arjun's comment as a starting point, so we have Rad Safe workers, tunnel workers prior to 1966. Is there any way to statistically or in any other way get a sense of whether or not this was a prevalent problem? Is there a way to approach by looking at the number of zeros? I mean, is there a way?

MR. ROLFES: Sure, we've proposed previously if you look at an individual's case file to determine whether they exceeded or, you know, approached an administrative limit in a give quarter. For example, if a Rad worker went into a tunnel, received 3R working in that quarter in that tunnel, went in again. The next quarter received another 3R or whatever the administrative limits are at the time period, of the relevant time period.

And then suddenly we notice a drop off indicating that there was no dose received from the following quarter, one could obviously look at the previous three quarters

and assign -- for example, if we had indication that a badge was, in fact, removed and that they were working in the work area, we could assign the same dose, we could assign the highest dose received in the first three quarters of the year.

So it is something that we can certainly account for I believe. But we would have to review that information on a case-by-case basis. And I think that we had incorporated a statement like that because of SC&A's request. I believe that we had, in fact, incorporated that statement in the external dose TBD.

Gene?

MR. ROLLINS (by Telephone): That's correct.

DR. MAKHIJANI: It was a case-by-case basis; my response was that this is not a case-by-case issue.

DR. NETON: I think in line with what Arjun's raised here though, we can go back. I don't know what can be done with this other than SC&A has sharpened their pencil a little bit and are now saying, well, it may just be a class of workers between, in this case up to

’66, there were tunnel workers and re-entry workers and I’m not sure --

MR. ELLIOTT: Well, SC&A look at this and look at this class of workers and tell us if you see something there. We think our approach is sound, and we don’t see anything as we go through these individual dose reconstructions. If we find, as Mark has outlined, where there’s a trend that looks to us like there’s something amiss in the history of the dose and the employment, then we take action on that. And that’s one of the ways we validate data.

So I would ask if SC&A is so convinced that there’s something here, let’s see a little bit more of that. What is it? Is it the class? Can you tell us how that particular category of worker is affected? Is it pervasive? Is it all this one set of workers that had to go in and, the carpenters who went back in and took down the barriers that were sitting there? I don’t know.

I can envision. I truly believe that this happened. I believe that there are situations where a worker said I don’t need to

wear this badge. Nobody's looking over my shoulder. I'm on the site. I've got to do the job today. I'm maybe getting close to my limit so I'm going to set this badge aside. I'm pretty sure that happened. But I don't believe it happened on a wide-scale basis across the site.

I think it was situation dependent. That's my own personal belief. So if that's the case, does our averaging, does our approaches toward reconstructing dose become impaired by this practice? And we're saying to you that we think we can address that in our approaches.

DR. MAKHIJANI: Well, this, a couple of things. I think the way you put it misconstrues the problem, at least as I've tried to put it on the table. The idea that this is an occasional one-off thing contradicts the site expert evidence that we got in an interview, and even more than one. And that has also been presented before the Board. So that, I think, is an issue, in my opinion -- now, the working group and the Board may dismiss this, and then I will just

not raise it any more. In my opinion there's a question of what are the criteria by which site expert evidence is to be accepted? Is it -- right now, the appearance -- well, I'm not going to characterize it.

MR. ROLFES: Once again, all the sources of information must be considered.

MR. ELLIOTT: And we have site experts that essentially contradict the assertions that other site experts make.

DR. MAKHIJANI: So we've had, so right now I am not clear on whether we have a set of criteria by which we're going to accept, or by which NIOSH accepts site expert evidence. And when there's contradictory evidence, do you accept the evidence that you feel comfortable with because it agrees with how you're doing dose reconstruction currently? Or do you re-evaluate that?

MR. ELLIOTT: We accept the weight of the evidence. We look at all of the information we have at hand, and we make a decision upon that basis.

DR. MAKHIJANI: And that's why what happened at Rocky Flats truly puzzled me. Is how can

you set aside documents from the time for a 40-year memory of a person who wasn't even present and didn't even give a document?

DR. NETON: I don't want to rehash that whole Rocky Flats. If you recall, the building that was cited in that report was sort of ancillary to the report. It wasn't the subject of the report, so it was not really under investigation. It was just included as sort of a, almost like a -- I don't want to mischaracterize it -- but as a side note in that report. It was not the focus of the investigation.

So it was quite possible that that was not researched, and it was just misquoted. That's the weight of the evidence you have to look at, into what context that building was cited and why. You're portraying as if it was the focus of the investigation. It was not. In the report it's an ancillary quotation.

DR. MAKHIJANI: I did not say --

DR. NETON: That's what I'm saying though. You have to look at the weight of the evidence like Larry suggested.

DR. MAKHIJANI: I'm presenting a question as

I saw it. The weight of the evidence -- and I felt it very serious at the time, and I still do feel it very serious. And this is a problem that arises in a lot of different contexts, and I'm not the only one certainly to bring it. It's a widespread perception that NIOSH doesn't listen to certain groups of people. And I think even unfairly very often negatively affected your program because I can see when you are listening or when you are being fair, people may still have the perception that you're not listening.

DR. NETON: There will always be someone upset because there's two sides on every issue.

DR. MAKHIJANI: Right. So I'm just trying to be as objective as I can in this situation which obviously there's a question of judgment involved. We have there a situation where on the datasheets themselves, there was no indication that the thorium strikes took place there. The data were just data without a mention of the radionuclide. You had two documents, one history and one contemporary document from that time that both mentioned

exactly the same thing, that it happened in a different building than what NIOSH was asserting. And opposed to all of that you had one person who was there at the time and remembering from 40 years before that it happened in a certain building. Okay. I think that this certainly calls for some question as to what are the criteria because I'm very puzzled because if NIOSH accepts that --

MR. ELLIOTT: We have spoken to this. We've already provided an answer to this issue in the Rocky Flats deliberation. We explained, I think -- I don't have the details in front of me. I'd have to refresh my memory, but as Jim said, and I think others here can confirm, we've explained this. We look at all of the information at hand. We take all of that in account, and yes, we arrived where we arrived, and we think for good reason.

I'm sorry if people out there feel that we are not listening, but we are doing our best to not only listen and then to act. And I know we can improve upon that, and we're striving to do so. It's clearly written in

our regulation. It's clearly exhibited, I feel, in our policy, and I hope it's becoming clearer in our practices that we account for all information. We take the weight of the evidence, and we have to decide upon that.

DR. MAKHIJANI: Well, I'm not representing anybody except the team that I led to do this. And, John, you might stop me if you think I'm out of order here, but I definitely concluded the contrary in the case of Rocky Flats. In my profession judgment I felt that the conclusion that NIOSH arrived at in regard to the weight of evidence as to where this thing happened was not warranted. There needed to be more evidence, at least something that said thorium than a 40-year old memory of somebody who was there. Because 40-year old memory have been treated in a different way in other contexts. Oh, it was long time ago, and it's very hard to remember. And that has --

MR. ELLIOTT: And I think we've said that. We understand that, but we have not used that as a crutch or an excuse.

MR. PRESLEY: At this point what we're discussing is the NTS site profile, not the

Rocky Flats. We have had problems with this in the past. What I see at NTS is that they have the data to do the coworker models for the people that they cannot find data on. Now, and I'm happy with that.

If somebody wants to come up and say working group, you all need to make a recommendation to the full Board that somebody comes back and looks at this problem as a different working group looking at non-badge use on all sites, I have no problem with that. What we're looking at here is the NTS site, and I really think that we have the data to do what we want to do on this site. Rocky to me is a total different question. Now, if I'm out of order, somebody say that, but right now that's my point.

MR. CLAWSON: Was it Baker, the interview with the Health Physicist down there? The one that has just passed?

DR. MAKHIJANI: Well, it's published in our site profile review, and I can show it to you.

DR. ROESSLER: We don't need to mention names.

MR. CLAWSON: Oh, I just, there's a lot of

things stated in there that have to be addressed with that. And you, I don't think that there is in anybody's point of view, we're all trying to do the same job, and we're trying to do it the best we can because all of us basically report back to the people, the claimants.

And I don't think that anybody's purposely trying to address it towards that someone isn't doing their job. But we do still have to address the comments that are made. And every time we get into this, this keeps coming up, and we've got to be able to tell the petitioners how we've addressed this. Because this isn't just this site. I know this is the one we're focusing on, but we have to be able to address this in some way.

DR. WADE: Now I can, just as a commonsense individual, I can propose two ways to address it. But let's define some parameters. Again, Arjun talks about pre-'66 two classes of workers, Rad Safe workers and tunnel workers. Jim says very appropriately that it becomes an issue of the preponderance of the evidence. How large a problem is this?

We say, commonsense people say, you can use coworker models but in order to use those coworker models you have to have confidence in those models. And that means that there has to be sufficient number of data points that you build those models on that you can rely upon. This is a pervasive problem and maybe you don't have that. So one way to look at this is to try and address the issue is are the coworker models robust in light of this problem? And I don't know how you do that, but that's one intellectual way to do this.

The other way is to just take the sort of the lawyerly approach is, this is an issue of the preponderance of the evidence and have someone prepare a document that lays out the evidence and draws a conclusion and let people debate that. So I think you have two classic approaches if the work group wants to take an approach or the work group could decide it's comfortable on this.

But I sense in the work group that there is still some division and there needs to be something done to put this issue to

rest. I would hate to punt this and then come to face the 11th hour of the SEC determination and have this issue in front of us.

I think there's time now to work on it, and I see two ways: to determine if the coworker models are robust enough given the potential presence of this problem or lay out the arguments with the preponderance of the evidence and see who, what side prevails. Does that make sense? So is there a way to do, there's a way to do the second obviously.

MR. ELLIOTT: To do both, I think the former, if that were to be done, that would be us. NIOSH should defend its coworker model and the robustness of that. If it's the latter, to develop the argument for why this should be, is a concern, then I think that's something the working group should either develop or have SC&A do.

DR. WADE: Arjun, do you understand what I'm saying? Are you comfortable with those approaches?

DR. MAKHIJANI: I'm not sure about the preponderance of the evidence and how one would go about doing it even, you know, the

claimant population is first of all a subset of the people who were there, and we're talking about a pretty restricted period. So I would have to consult with people like Lynn and others.

DR. WADE: Yeah, what you do is just lay on the table in some room the evidence. You'd have people document what it is and then draw a logical conclusion from it.

DR. MAKHIJANI: The evidence in terms of the expert evidence and the policies that were at the Test Site in terms of the hazard pay policies, we discussed at some length in the site profile. In order to go beyond that into the numbers I really don't know sitting here how you would develop that from the population that worked at the Test Site. Because, I mean, this came up earlier today that we don't know how representative the claimant population is and you can't really establish that. You can assume it's representative because it's large. And in this case you're talking about two small groups of workers. At least as I sit here I can't give you an instant response as to how I would do it. I'd

be happy to take it back and talk about it and send you a proposal.

DR. NETON: I'm against making more work for anybody, but it seems to me the technical evaluation would be worth looking at before we went to this preponderance of the evidence issue. I think the technical evaluation can shed some light on it, and they actually feed into the preponderance of the evidence.

DR. WADE: I think that's exactly the way it should proceed.

DR. NETON: And it seems that we've got a couple small groups of workers here, and hearing what Mel said that, and I think it's probably true, that we have a small subset to begin with. And then probably very few workers typically in these populations approach the regulatory limits. So now you're even looking at a smaller subset. I don't know how far down you go, but let's say so many people above a certain rem.

And then you can start looking, okay, how many people does that potentially affect, maybe not many to begin with. And then you can look at those and look at the distribution

of the coworkers and see is there, indeed, some curvature in this cumulative probability of distribution? Probably going to be as well documented if that happens. As workers approach the administrative limit, they take them out of the workplace. But how bad does that curvature occur and how many workers?

I mean, we can put some light on this issue based on these more narrow focused timeframe and the worker population and see what shows up. I can't --

MR. ELLIOTT: Can we do that not on our claimant population but on the data that NTS holds?

DR. NETON: Yeah, I think --

MR. ROLFES: What we currently have in our coworker external dose table it is a -- let's see --

Gene, could you please answer Larry's question regarding reviewing the entire set of all of NTS external dosimetry data? Do we have access to data that would allow such a review?

MR. ROLLINS (by Telephone): As I understand it, we've had difficulty retrieving

information that is not claimant related.

MR. ELLIOTT: Well, DOE has to provide us coworker data which is not claimant-related data. It is coworker data. It's data relevant to a category of workers at the site whether it's all workers or the subcategory. And so if we're having trouble, we'll talk to DOE about that.

DR. NETON: Let me ask the question, what, do you recall what the coworker data is based on right now?

MR. ROLFES: Well, we currently have this basically a number of personnel that received a given dose by year, so it's essentially the same information which does incorporate all individuals that worked at the Test Site, and that is currently in the TBD. And I believe we had provided some discussion that this was added to the site profile to address these situations where an individual was potentially not using their badge.

DR. NETON: I think we need to take a look at what we have.

MR. ELLIOTT: ^ DeMers have always been helpful to us.

DR. NETON: I don't want to commit NIOSH to doing a several month investigation here, but since we've got a three-year time window we're looking at possibly with a couple selected worker populations, it might, famous last words, it shouldn't take that long. Now if it's going to be a major research effort, we might need to revisit that and say, you know, take a different tactic. But it's worth looking at technically. Let's look at the data and see what we can find.

MR. PRESLEY: Okay, on Comment 20 then NIOSH is going to look at the coworker tables and data and get back to the Board with some type of a recommendation on this non-badge uses. Is that correct?

MR. ROLFES: Now is this specific to a certain timeframe then?

MR. PRESLEY: Before 1966.

DR. NETON: Clearly we'll look at the highest exposed workers because that's the only population this really affects, people who have low dose are not going to be inclined to take their badges off unless people want to go there.

MR. ELLIOTT: That's based on the assumption that the primary motivation is to not get burned out.

DR. NETON: That's correct, and that's --

MR. ELLIOTT: And there are other motivations to not wear your badge. We recognize that, but the primary one we assume to be that you don't want to get burned out. I expect you've got readings in the third or fourth quarters in particular, you'll see a drop.

DR. NETON: We looked at this, I think, at Rocky Flats, and it was fairly inconclusive looking at the technical data, looking at the actual, but we were looking at a much broader, we cast a much broader net there. Here if we focus it a little more narrowly, maybe it'll be easier to look at.

MR. PRESLEY: Is this concept acceptable to the working group?

MS. MUNN: Yes.

MR. PRESLEY: Okay, and then we will get back on this subject at some point in time.

Let's break, and we will start at 1:30 on Comment 21. Is that all right? Be back

here at 1:30?

DR. WADE: We're going to break the line gentle people, and we'll call back in a little bit before 1:30. Thank you.

(Whereupon, the work group recessed for lunch from 12:35 p.m. until 1:35 p.m.)

DR. WADE: Hello, this is the work group conference room. We're just about ready to begin. Can anybody hear my voice out there?

MR. RAFKY (by Telephone): This is Michael Rafky. I can hear you.

DR. WADE: Thank you, Michael. We're about to begin.

Robert, are you ready?

MR. PRESLEY: Yes, sir.

DR. WADE: Okay, here we go.

MR. PRESLEY: Do we want to go and see who's on the line again before we start?

DR. WADE: Well, we could ask NIOSH and ORAU folks on the line to identify themselves, please.

MR. ROLLINS (by Telephone): Gene Rollins is here.

DR. WADE: Hi, Gene.

Others? NIOSH/ORAU?

(no response)

DR. WADE: SC&A?

MR. ZLOTNICKI (by Telephone): Joe Zlotnicki here.

DR. WADE: Hello.

Other SC&A?

(no response)

DR. WADE: I'm sure John Mauro will be joining us. I was just on the phone with him.

Do we have workers, petitioners, their representatives on the line?

(no response)

DR. WADE: Other feds on the line?

MR. RAFKY (by Telephone): Michael Rafky again, Lew.

DR. WADE: Hi, Michael.

Board members?

(no response)

DR. WADE: Anybody else who wants to be identified?

MR. SMITH (by Telephone): Billy Smith with Chew.

DR. WADE: Okay.

MR. ROLFES: Before we begin I believe Billy Smith might want to add some comments. He was

a former Nevada Test Site Health Physicist.

Billy, would you like to make any comments in regards to our earlier discussions?

MR. SMITH (by Telephone): Yes, I would. Can you hear me?

MR. ROLFES: Yes, we can.

MR. SMITH (by Telephone): Yes, I would. In regards to the discussion that Arjun was having regarding the prevalence of employees removing their dosimeters, in the 27 years that I was at the NTS, and I was involved in the Health and Safety Program for all that time. I began my career as a tunnel Health Physicist, and most of the time I spent there was working with the radiation monitors and the miners.

And I can say that from 1966 on, I never experienced one occasion where anybody had to remove their dosimeter in order to do work. I can’t even remember anybody even being reported as having removed their dosimeter at that particular time. Now one of the things that I do know is that whenever workers, including miners or any other

construction workers, had to work in a radiological area, they were accompanied by what we called at that time radiation monitors. Now we call them RCTs.

So these workers would have been people who would have received probably the highest external or internal exposures that any other worker at the Nevada Test Site would have experienced. So it would probably be good to do a coworker study that would allow looking at the radiation monitors for any particular era and see what kind of doses they got and see whether or not you can determine from that that whether or not the practice of people removing their badges might have been in use. But again to my knowledge that never happened.

MR. PRESLEY: Billy, this is Bob Presley. How are you?

MR. SMITH (by Telephone): Yes, Bob, just fine, thank you.

MR. PRESLEY: Could you supply us with some names of individuals between 1959 and 1966 that might have been the persons in question at the test site? Is it at all possible for

you to do that?

MR. ELLIOTT: Not over the phone.

MR. SMITH (by Telephone): No, I understand that. Bob, I don't know. Like I said, I don't know of anybody who was ever reported by name to have done that. The only thing that I can tell you is this. Is that the dosimetry record system has a difficult time retrieving information if it's not for a claimant. So we would have to go to the personnel records and identify people who were classified as radiation monitors and then have the dosimetry people to retrieve those records of those people to see what kind of exposures they may have gotten.

MR. PRESLEY: Bill, we'll do that.

MR. SMITH (by Telephone): Another, well, there was one other comment that I'd like to make. There was a comment John made this morning about the ratio for the beta versus gamma on the dosimeters, and he was concerned about the fact that the wrapper around the film badge was too thick to allow any measurements of beta particles below 500 keV.

That may have been true for those

early dosimeters, but an interesting question that I have regarding his question is then how could people have gotten low energy beta exposures since they were wearing clothing whether it was anti-contamination clothing or personal clothing?

MR. PRESLEY: Well taken.

DR. MAKHIJANI: Joe, I think that question was directed at you.

MR. ZLOTNICKI (by Telephone): Well, I think the answer is with beta you get into a, obviously depending on the site of the cancer, but clearly there are likely to be situations where some of the skin of the body is exposed, most notably the face, but possibly the forearms and hands in some situations as well.

MR. SMITH (by Telephone): Yes, I agree.

MR. ZLOTNICKI (by Telephone): And I don’t know if people wore shorts there or not when they were in hot zones in hot weather. I have no idea. ^ they got a partial, potentially got a partial skin exposure, not a whole skin.

MR. SMITH (by Telephone): No, shorts were not allowed.

MR. PRESLEY: Not at all.

MR. RICH: Any time there was significant exposures to mixed fission products, contamination control clothing including face shields and most often the respiratory protection.

MR. PRESLEY: Bill, thank you very much for your comments. We appreciate that.

MR. SMITH (by Telephone): Okay, I'll be here if you need to ask me any questions. I'll be more than glad to give you the benefit of what I've experienced.

MR. PRESLEY: Thank you, sir.

COMMENT 21: EXTREMITY DOSIMETRY

Let's start again with the matrix. We left off at 21. Twenty-one has to do with extremity monitoring. Data appears to exist from '69 onward. There were only rare instances of monitoring prior to that time. The response on this is -- Arjun, do you want to --

DR. MAKHIJANI: I think from 1967 onward it doesn't seem to be an issue. This was an issue before 1967, and I don't think, well, the status that we concluded from the TBD review was extremity monitoring data appeared

to be in use from 1967 onward. There were only rare instances of monitoring prior to that time. NIOSH has not proposed a dose reconstruction method to deal with this issue for the pre-1967 period.

So we didn't see anything new in the TBD for the pre-1967 period.

MR. ROLFES: Those people that were doing hands-on work with radioactive components such as people that were handling core samples or people that were doing the device assembly would have been the ones with the highest potential for exposure to their extremities. In looking through NOCTS we looked through device assembly workers at Nevada Test Site, and neither of those two individuals we located had skin cancers of the extremities making the need for those two individuals moot. We didn't need to do an extremity dose reconstruction of these two cases.

DR. MAKHIJANI: Were there data in your files for extremity monitoring?

MR. ROLFES: We wouldn't need the extremity monitoring data if we didn't have a cancer to reconstruct on the extremity though.

DR. MAKHIJANI: No, no, I mean that's, the cancer --

MR. ROLFES: But as ^ I didn't look, sir.

MR. PRESLEY: Okay, the action on this is the evaluation of extremity dose for skin cancer is discussed in OTIB-0017. Has this been reviewed?

DR. MAKHIJANI: I'm not with you on that one.

DR. ROESSLER: Arjun, he's using the --

DR. WADE: Response 21.

MR. PRESLEY: On page 12, I'm sorry, page 13.

DR. MAKHIJANI: Does OTIB-0017 discuss how to evaluate it in the absence of any data or, I'm not familiar with OTIB-0017.

John, are you familiar with OTIB-0017?

(no response)

MR. ROLFES: Gene Rollins, could we have you explain what we have incorporated into the matrix here? We put a statement in the matrix that says evaluation of extremity skin dose is discussed in OTIB-0017. Could you please elaborate on that?

MR. ROLLINS (by Telephone): I'm not sure

that I can. Where are you reading this from?

MR. ROLFES: We're back onto the full matrix on page 13 of 14 under response number 21. We've got a statement in there regarding the evaluation of extremity dose for skin cancer which is discussed in TIB-0017. And then we also have a statement that says the ORAU team Technical Basis external one, Section 6.4.2.6, page 51, as well as Section 6.5.2 on page 59, have discussion of this.

MR. ROLLINS (by Telephone): I'm not sure why the reference to OTIB-0017 would be applicable. That's how we determine shallow dose, and I don't know how. I don't know why that was put into the matrix.

MS. MUNN: Well, and in any case, this item is really complete.

MR. PRESLEY: Yes.

MS. MUNN: We have indicated that it was done. That was just additional information I think.

MR. ELLIOTT: Well, we need to look and see if this comment we put in here is appropriate for this response or not. And if it's not, we should sure seek its deletion. If it is, we

should explain why we think it is.

MR. ROLFES: It may just be that additional details on the interpretation of dosimetry records for assigning shallow dose is discussed in this TIB.

DR. ROESSLER: On the shorter matrix there's more information. It refers to the interview with Bruce Church.

MR. ROLFES: Yes, we did specifically ask Bruce about -- let me take a look and see where we -- I specifically asked him what do you recall regarding neutron on extremity dosimetry for assembly workers, weapons developers and scientists tracking specific programs. He indicated that they did extremity and neutron dosimetry at NTS and at the labs. There was a potential for neutron dose for weapon developers. Extremity dosimetry was used as needed. Not a lot of people required neutron monitoring. And the facility workers also, in fact, had extremity monitoring. Let's see, the number of people that would have been involved in the final assembly of a weapon, for a device to be tested was very, very few.

MR. RICH: This was Security control.

MR. PRESLEY: Yes. Well, it was also controlled by the --

MR. ELLIOTT: Probably enough said.

MR. PRESLEY: Okay, the response to that is HHS is going to look at OTIB-0017 and see what the, why it was in there. If it wasn't, then we will take it out. And I see absolutely no response from the Board. This will be gone over when we do the complete review for completeness. Anybody have anything?

DR. ROESSLER: What about SC&A? Is there anything left hanging on this one?

DR. MAKHIJANI: No, I think we've made our comment. I mean, the data before 1967 don't seem to exist, and the statement is that there were few workers. So I mean, I don't know what more, I would agree that there's no --

MR. RICH: Could I say just one more thing. That the lack of obvious workers could very well be because the assembly were done by laboratory people. It was not by contract people. And these people, at Los Alamos for example, were controlled separately and the records are separate. And so as a consequence

that probably accounts for the fact that...

MS. MUNN: Not any NTS workers.

MR. ELLIOTT: But let me just play that out a little bit, Bryce. Are you, in your statement is it an implication that a person from Los Alamos who was sent down in final assembly would have worn a neutron badge or would have been monitored for neutrons in a way?

MR. RICH: No, no, I can only speak for Livermore because that was my responsibility. And we wore an NTS badge.

MR. ELLIOTT: You wore an NTS badge so you wouldn't have had your neutron dose monitored either.

MR. RICH: Except that it was monitored ^ survey instrumentation ^.

DR. MAKHIJANI: Are we on 21 or 22?

DR. ROESSLER: Yeah, are we talking about a neutron dose or --

MR. PRESLEY: Twenty-one, we're talking about 21.

DR. ROESSLER: I thought it was skin --

MR. ROLFES: That was related to extremity monitoring more so than neutron dose, but --

MR. ELLIOTT: I'm sorry, I thought you were on 22.

MR. PRESLEY: We're not there yet.

Anybody have any problems with 21 then?

(no response)

COMMENT 22: NO NEUTRON DOSE DATA UNTIL 1966

MR. PRESLEY: We'll move on. Okay, go back to the six-page document, the Comment 22 is ORAUT 2007 has not provided an accurate scientific basis for the use of n-over-p ratio of 2.5 unmonitored assembly and TRU waste workers. The recommended use of the ratio from Pantex does not have an adequate scientific foundation. The neutron exposure issue for both these groups of workers is still outstanding for all cases when they were unmonitored. Response: That the supplemental justification for 2.5 instead of 1.7 in the Pantex TBD is in process.

Arjun, do you want to address this just a minute?

DR. MAKHIJANI: Yeah, I can go through this in the various parts. One is that we didn't review the calculations in detail about Test

Site workers in terms of the doses at six kilometers, but the approach looked reasonable, and we agree with the general. There's not an outstanding issue there anymore.

The only note that we made was that site expert interviews, as the same expert as I interviewed for the site profile review, indicated that the NTS personnel were present in the forward areas with the military personnel, some of them. But I think you have, in any case, you have the ^ of neutron dose closer than six kilometers, but just raising that in a question since it was stated that it would generally not be present. There's no particular action or follow up there because, as I remember, you have doses closer than six kilometers calculated also.

In regard to the neutron areas that were mentioned, the revision of the site profile suggested an n/p ratio of 2.5 for assembly workers. Basically, it was Pantex ratios, 2.5 and 1.7, for assembly and transuranic waste workers. Recently, SC&A has sent to the Board our Pantex site profile

review. I was not involved in that. I just looked at what we had said for the neutron/photon ratio as they apply to Pantex.

And as noted here our team had said that the ratio chosen, whether it was 1.7 or 2.5, was claimant favorable in many cases but that was not claimant favorable in other cases. And even 2.5 would not be claimant favorable in some cases for Pantex itself.

And transferring Pantex data with different physical configurations, different buildings, different arrangements, different devices, and in Pantex it was the neutron/photon ratio was found to be device dependent. So it didn't seem appropriate to do that because it varies a great deal according to device and time. And so we did not agree with the use of a constant neutron/photon ratio or with the transfer of Pantex data to NTS.

Then there was the question of neutron sources. And there's a nominal ratio of five that has been suggested, but the references are not specific to NTS so far as I could determine. Is that correct?

MR. ROLFES: As far as neutron sources I would have to ask Gene Rollins.

DR. MAKHIJANI: So far as I could determine, there were not.

MR. ROLFES: Okay, Gene, did you hear the question?

MR. ROLLINS (by Telephone): Yes, they probably would not be. But these would in all likelihood be not untypical from commercially available well logging sources.

DR. MAKHIJANI: Now the neutron-to-photon ratios cited there as being greater than five to as high as 29. And but we don’t know why a single ratio of five --

MR. ROLFES: What was the single ratio chosen?

DR. MAKHIJANI: Yeah, basically we felt that the ORAU team and NIOSH did not adequately justify the use of a single ratio of neutron sources and also they were generic numbers and not site specific. And you know you’re a little bit uncomfortable with the use of a non-site specific neutron/photon ratio.

MR. ROLFES: Well, as we’ve indicated there is supplemental justifications for putting

something in writing for neutron-to-photon ratios for information regarding neutron surveys.

DR. MAKHIJANI: Subsequent to our sending you the ^?

MR. ROLFES: Yeah, we are providing, we are in process of providing supplemental justifications.

MR. PRESLEY: In other words what we need to do is make sure that this TIB 8-6, ^ as Attachment D, 117 through 121, are those the pages that we need to look through. Is that what we need to ^?

MR. ROLFES: Gene, could you or is there anything that Richard ^ has provided that would help to better address the question? We are actively working on putting some supplemental responses and supplemental information together. Is that correct?

MR. ROLLINS (by Telephone): He basically reiterated that the only way that we could get our arms around this would be to go into the site records and site procedures to see what work had been done as far as characterizing the neutron fluxes around these types of

devices and to look at actual monitoring data to see if we can determine what the photon-to-neutron ration may have been for these people that handled these devices.

MR. PRESLEY: So we owe this information then to SC&A to evaluate for completeness after you all get through with it.

Yes, Wanda?

MS. MUNN: The supplement's coming.

MR. PRESLEY: Yes. Can we do that?

MS. MUNN: Sounds reasonable.

MR. PRESLEY: Okay.

MR. CHEW: I do have a question, Bob.

MR. PRESLEY: Yes, sir.

MR. CHEW: What do they mean by devices? Are you talking about neutron sources? Are you talking about ^? Are you talking about device assemblies? What's the difference?

MR. PRESLEY: Well, you're talking about your neutron sources, aren't you?

DR. MAKHIJANI: Well, there were both. There were the actual devices, and then there were neutron sources in a separate section with different neutron-to-photon ratios, right, Mark?

MR. ROLFES: I'm sorry, would you repeat that, please?

DR. MAKHIJANI: The question was, are we talking about neutron sources or devices. And my response was that there are separate sections for both, and we responded to both.

MR. ROLFES: So you're questioning if we can provide something?

DR. MAKHIJANI: No, it was just a question about what we were doing.

MR. CLAWSON: What neutron sources?

MR. ROLFES: Well, it does mention here though, it mentions here for unmonitored assembly workers as well as TRU waste workers. So it's two separate source terms that we're referring to.

MR. ELLIOTT: The assembly would be the device.

MR. CHEW: Let's talk about devices, okay? As Bryce was saying, when we're talking about an actual device assembly for a test -- let's focus on that, not sources. Those were all done by laboratory personnel and not NTS personnel. And I think, Bob, you know that.

MR. PRESLEY: Right.

MR. CHEW: They were not even allowed in the area until we had it all buttoned up, and then they were able to take it out of the building, 5310, and transport. They did that for them, right?

MR. RICH: ^

MR. CHEW: And even transport, that's right, because they had a caravan out to the forward area. They all ^ out to the red ^. I remember those days very well.

Secondly, what you're talking about, Arjun, is neutron sources recognizing that there are probably neutron sources ^ as logging, probably plutonium-building neutron sources for calibration of NTA film. That's probably where you would come up with neutron sources. Or neutron sources that they used to making sure the detectors that was part of the test operation was working.

Because what you're really looking for during tests is a source of neutrons very quickly and very fast. But so they did use those kind of neutron sources. Those were also handled by scientific and laboratory personnel. And so to answer your question

you're going to see a tremendous range especially in the area come back to where you're putting a device of working together those neutron ratios are going to be considerable smaller, especially as soon as you make it into an assembly as you well know. You know, you put things around it.

Where the neutron sources you're talking about why you saw a high ratio is that when you have a bare neutron source, plutonium, beryllium or polonium, you're going to see 30-to-40 times the amount of neutrons for the gamma because it is a source of neutrons. So we've got ^ in order to answer your question ^ exactly what you are really trying to answer here.

MR. PRESLEY: That's why I assumed sources.

MR. CHEW: So I'll give you any number you want, any ratio you want.

DR. MAKHIJANI: Our review was pretty clear about this. We reviewed it in separate sections and if you look at the Pantex site profile review, you'll see that our comments there -- which I didn't independently do that. I just assumed that our review, I accepted our

review at face value of that -- is that it was very device-dependent as you say. And in some cases this factor of 1.7 or 2.5 was perfectly good and in other cases was not, and was dependent on what they were assembling, and probably how long it took and so on. And we made our comment about the sources quite separately from that understanding that sources will have higher ratios.

MR. CHEW: But which one do you want us to focus on?

DR. MAKHIJANI: We have comments on both of them, and if there are lab workers that are not concerned with NTS, that was a separate issue that we raised earlier, can we kind of bracket if these were not workers that we should worry about for NTS. And then that discussion would stop in this context, and that would be fine.

MS. MUNN: One of my questions was unmonitored assembly --

DR. MAKHIJANI: There was no monitoring before ’66.

MS. MUNN: -- and TRU waste workers --

MS. MUNN: There was no neutron monitoring

before ’66 at NTS.

MR. CHEW: Well, let’s define what you just said. You’re saying that people at Nevada Test Site did not wear like an NTA film, right? That’s different than, there was neutron monitoring because I remember for a fact that when we were putting assemblies together, and Bryce would know that because I used some of his personnel to come up and measure the neutron ^ as we were putting the units together.

MR. RICH: Right, right.

MR. CHEW: So that’s neutron monitoring.

DR. MAKHIJANI: No personnel involved in neutron monitoring before ’66, and in the original review we had grave, if I remember right, the question of where do these workers belong and should we be talking about them here or there or their records may be in both places. So that may be the bigger issue of unclarity. Maybe that’s resolved. I don’t know.

MR. CHEW: Because if they are really technical people from the scientific laboratories there at DOE, they’re really not

part of this NTS discussion. Is that correct?

MR. ELLIOTT: I'm not so sure. Because when we do a dose reconstruction for a claimant, we call for DOE to provide us dose information for all sites that person worked at. And so when they produce it, let's say it's a Livermore chap who went to Nevada Test Site in Device Assembly Operations, then his badge would have been issued by NTS for the days he was there.

And we would get that dose result back for the dose reconstructor to account for it. If that badge did not have NTA -- not an NTA -- or didn't have a neutron component, then that's what we're missing for that particular individual's experience at Nevada Test Site. Under the Test Site site profile, I think it's inclusive here.

MR. CHEW: Well, what would you say described this ^ exactly what happened?

MR. ELLIOTT: So it begs the question what are we doing about neutron exposures for people who were at the Test Site either as a lab person for a short time period doing what they were doing or as a Nevada Test Site

employee, contractor, subcontractor, doing whatever they were doing. Is that --

DR. MAKHIJANI: Yeah, that clarifies it more than it's ever been clear for me.

MR. ELLIOTT: Well, I finally got something right. That's enough, Larry, shut up.

MR. PRESLEY: What we need to do, I guess, is task CDC with coming up with, I don't want to say a procedure or a white paper or whatever they want to do about what they've been able to find out or how to monitor these workers.

MR. ELLIOTT: How about assign neutron dose?

MR. PRESLEY: Up to 1966, is that correct?

DR. MAKHIJANI: I think the issue's only up to 1966.

MR. ELLIOTT: So we've really got three scenarios. You've got a lab worker who comes in, short duration, does what they do. You've got an onsite worker who's there doing whatever they normally do. And then you've got this other scenario situation where the exposure really is driving the thing here, and it's either to a source or it's working on a device.

DR. MAKHIJANI: Right. Let me clarify that actually. It says partial data through ’79, and I don’t know that we’ve ever addressed that question. Maybe you have a coworker model or something. Do you have a coworker model for neutron or partial data? I mean, the people who were monitored were the ones at risk of exposure. I’m not sure that we ever cleared that up.

MR. ROLFES: I can tell you what we do have in our review of the 200 claim files that we completed. I did allude to the neutron dose. I did ask Mel to pull up the Microsoft Word document that I did before regarding the 200 case dosimetry files that we reviewed.

We reviewed 200 claim external dosimetry files to examine them for positive neutron beta and gamma results. Of the 200 claimant files reviewed, only one positive neutron result for one individual was located.

And do you recall what area this building was in or what that building might have been?

MR. ELLIOTT: In what timeframe?

MR. ROLFES: This was in the more recent

time period. This was from -- let's see, once again I'd have to clarify this with the person that did the review, and I think we're going to prepare something from our review for SC&A to look at. So we can incorporate discussion of this review in the document that we give to SC&A.

MR. PRESLEY: You're going to provide SC&A something on the neutron dose capture?

MR. ROLFES: We will provide --

MR. PRESLEY: Is that a good word?

MR. ROLFES: We will provide information regarding neutron doses as well as some discussion of the partial data up to 1979 I guess is what the question is.

Gene, do you have anything to add about the partial data up to 1979 for neutron dose?

MR. ROLLINS (by Telephone): No, I haven't seen that yet, Mark.

MR. CLAWSON: There was one other comment to come up and Larry did it so good, if I remember right at the very beginning of this one of our questions for the earlier years was how the badges went back and forth. We're all

under the impression that when Livermore came out, they used NTS or Nevada Test Site badges and so forth. And I thought that we had checked into that, and we had clarified that that was so, and that they showed results for us. I just --

MR. ELLIOTT: Yeah, we're getting that all the time.

MR. CLAWSON: Yeah, and I just wanted to make sure. I know there was a question of that and when they brought that up --

MR. PRESLEY: It wasn't just Los Alamos. I mean, they were, it was everybody.

MR. CLAWSON: I realize that, and I just --

MR. PRESLEY: You turned your badge in, and they put it on the wall. The badge you wore in there from wherever you were from hung on the wall. You picked up your NTS picture badge, and that's what you wore.

MR. CLAWSON: And I realize this is what this came from was from some of the claimants of how and where they filed for, if they had to file an NTS for this or if they have to, if they were filing like Lawrence Livermore or anything else like this. And this is just

why, for --

MR. RICH: And it gets just a little bit more complicated than that so I might as well throw it out there anyway. Lawrence Livermore Laboratory had a residence site, a resident group that oversaw the support and the testing of devices onsite. In addition, the resident Livermore people came out frequently and there was that group and they were monitored, both at Livermore and at NTS. And so in addition to the support team that was the resident contract people and other contract people, like EG&G and others.

MR. PRESLEY: And that's one reason we're working on this 180 day thing, I mean this 80 day thing or whatever it is with trying to work on the 250 day deciding what the date's going to be because of the people that worked out there full time.

MR. ELLIOTT: And we know that Labor does treat it as 86 days.

MR. PRESLEY: Is it 86?

MR. ELLIOTT: Eighty-six. Labor has a Technical Bulletin out, and if you were stationed there, living there, then you don't

have to stay there 250 days. It's somewhere on the order of 83 or 83 days.

MR. PRESLEY: Okay.

MR. CHEW: I just wanted, Arjun, I just wanted to discuss with you about the neutron/photon ratio. I want to be careful what we say, okay? Remember the data you're talking about from Pantex only happens under a certain situation, and immediately it very much changes, very quickly, as you well know as you're doing an assembly.

Because I just now recall, because I just realized I'm in an SEC class already. I guess it was based on the time. So what you would do is take my badge from Nevada Test Site and look at the number of photons that are on there and then add a neutron component. Is that what you're suggesting here?

DR. MAKHIJANI: That's what suggested in the --

MR. CHEW: Yeah, but that only happened to me while I was only assembling the unit for a very sort time, and the majority of the photon I had gotten was probably on recovery. You see what I'm saying?

MR. RICH: It's ^.

MR. CHEW: Yeah, it's a way ^. That's where I'm coming from. The amount of neutrons I got was so small, I don't care what the ratio was ^. I mean, I do, but for ^. I just want to make sure we focus. We were not constantly exposed to neutron and photons at the same time.

MR. ROLFES: Certainly there's a limited number of assemblies associated with a limited number of tests. I think it's only during those tests -- excuse me. It's only during those assemblies that a person would have a significant risk for neutron exposures. The other exposures that a person would be receiving would be to, as Mel indicated, the other high exposure scenarios would be during re-entries or during some discrete incident or accident involving fission products, you know, exposure to fission products.

So if we were applying a neutron-to-photon ratio based on recorded gamma doses for a person's entire work history, the neutron doses that we would be assigning would be a significant overestimate. And that's

typically what we do in a dose reconstruction.

DR. MAKHIJANI: Yeah, that could be. I think that's a different argument than the one that was made.

MR. CHEW: Well, that's reality.

DR. MAKHIJANI: What was in the TBD was you have a job twice for whom you're trying to calculate. You're trying to calculate a dose for a job type rather than a person because the TBD is generic in that sense, and you're shifting a neutron-to-photon ratio from Pantex to Nevada Test Site. And the comments that we made are in that context. I think when you put it in a broader context I think we're certainly open to the case that, especially in Nevada Test Site I would be, that for most of the work you've got photon exposures. You do into the tunnels or, you know, you go to recovery and so on. There are no neutrons there, but you have photons and beta.

MR. CHEW: Where I'm going with this I don't think the Pantex data really applies. That's where I'm going.

DR. MAKHIJANI: Well, that's what we're saying.

MR. ROLFES: It results in a claimant favorable dose estimate is what the Pantex data does for the NTS workers involved in this process.

COMMENT 23: SOIL DATA FOR RESUSPENSION DOSES

MR. PRESLEY: All right, moving right along. The next response is if you would go to the full response matrix and has to do with item 23, page 13 of 14, adequacy of soil data. And that has been addressed in Response 5, and as I see it should be complete. Okay?

Twenty-four -- anybody have any questions?

DR. MAURO (by Telephone): Yeah, this is John Mauro. On number 23 I believe that's part of the new white paper that Gene Rollins will be sending to us. I just want to make sure that that's correct interpretation.

MR. ROLLINS (by Telephone): That's correct, John.

MR. ROLFES: I think we also skipped over something that I wanted to make sure everybody's aware of. In these Rad paper reports associated with the Nuclear Reactor Development Station we do, in fact, have

integral gamma and neutron data at various distances associated with the reactor test.

This one is specifically for the Kiwi TNT test, and I think it's of interest to note that the gamma doses at all distances from the reactors are about 50 times higher, the dose rates are about 50 times higher than are the neutron doses. So I don't know if anybody'd like to see this right now or not, but so essentially and additionally, there's documentation in the Rad Safe reports giving the maximum recorded exposures for different tests, and also indication about the neutron doses.

I haven't seen any indication of positive reported neutron doses for the number of records that I have reviewed from the NRDS. So essentially if we have neutron and gamma dose rate surveys around these reactors, then we know the people that are involved and know the maximum gamma dose that personnel received, we can do a neutron dose calculation.

So anyway, we do that the data here for those limited number of individuals that

were involved in the testing of the reactors.

MS. MUNN: Good.

COMMENT 24: HIGH-FIRED OXIDES

MR. PRESLEY: On 24, it has to do with the presence of high-fired oxides resulting from the atmospheric weapons testing and the reactor testing, needs to be investigated. I have that marked as complete, review for completeness. NIOSH has revised the Technical Basis Document, Table 5D-24 to include a range of solubilities for most radionuclides of concern. And let's see, currently at OCAS. Is this something then that we need to, this thing gets reviewed? Make sure that SC&A gets page 51 of this to go over?

MS. MUNN: Yeah, probably so. We've pretty much put that to bed. I think it's more a question of verifying this document is appropriate, complete.

DR. MAKHIJANI: But for atmospheric testing it's a moot question.

MR. PRESLEY: Right, it's a moot question.

DR. MAKHIJANI: But for the rest of it, yeah, we could do that.

MR. PRESLEY: We talked about the --

DR. NETON: This action on NIOSH's part I think is done. TIB-0049 has already been issued.

DR. MAKHIJANI: Yeah, we've already reviewed --

DR. NETON: TIB-0049 is --

DR. MAKHIJANI: We've already reviewed TIB-0049.

MR. PRESLEY: Then can we mark this complete, no action necessary?

DR. MAKHIJANI: Are you reading from your most recent one? No, it's not there. Where are you reading TIB-0049?

DR. ROESSLER: Page 14 of the --

DR. NETON: It just says the action is NIOSH to develop a Super-S TIB guidance.

DR. MAKHIJANI: And that's been done.

MR. RICH: Yes, that's been done awhile ago.

MS. MUNN: And that's why I said it's primarily --

DR. MAKHIJANI: And, and we signed off on it.

MS. MUNN: It's just a matter of looking at it to see that its --

MR. PRESLEY: Then Response 23 is complete

with no action.

DR. NETON: I think the key in 24 was to say that Super-S exists at NTS. We agree with that, and OTIB-0049.

MS. MUNN: Let's look at the revised section.

MR. PRESLEY: Okay, 25 --

DR. MAKHIJANI: No action or look at that one page. I don't know. I've heard two different things from two Board members.

MR. PRESLEY: Do we want them to look at that one page when that is done? I thought it was done.

MS. MUNN: Well, just to verify that it's appropriately incorporated in this particular document. The issue itself is put to bed.

MR. PRESLEY: Mark, can you make sure that that gets sent to SC&A?

MR. ROLFES: Sure.

COMMENT 25: SITE EXPERT INTERVIEWS

MR. PRESLEY: Okay, this is the one we've been looking for. NIOSH documentation of site expert interviews is inaccurate --

MR. ELLIOTT: You mean inadequate.

MR. PRESLEY: -- inadequate -- I'm sorry,

sir. This has been beaten around for the last six months. Mark has gotten all of the paperwork as I understand it to ^ and may have gone over this. I believe we have a statement back from you all that you don't have a problem with this anymore.

DR. MAKHIJANI: Well, you know, we affirm it was inadequate, and NIOSH produced all the documentation, and we had some exchange of paper. There's nothing further to do on that. NIOSH now has a more formalized procedure for documenting these worker interviews and ^ database, and we're aware of it. We were recently trained^ to look at it. So I think in this context it's now a moot question. For NTS it's closed I would say.

MR. ROLFES: We also note I do want to indicate that we conducted additional interviews. There are a couple of other individuals that are not named here, but, you know, to be added.

MS. MUNN: It might be good for completeness to do that.

MR. ROLFES: I'm sorry, Wanda?

MS. MUNN: It might be good for completeness

to do that.

MR. ROLFES: We certainly will, we did put one individual's name in there, but there's a couple of more, at least that I could think of, that we could add to it.

ACTION ITEMS

MR. PRESLEY: Before we get into these other comments, I'd like to go over the action items and get that done for the site profile, and then we can go into these action items. On action item Response 1, I have nothing on that one --

MS. MUNN: No.

MR. PRESLEY: -- whatsoever.

Two, Mark is to write a white paper to SC&A on the Response 5, 6 and 7.

Number three, Mark to provide pages 79 through 83 on the new site that was on -- can't read my own writing here -- site description. That's what it is. When the new site description gets completed, you're to provide page 79 through 83 to SC&A. Also provide Table C-1-dash-C-2 and C-3.

MR. ROLFES: The site description is available so --

MR. PRESLEY: Yeah, and that's -- Arjun, you're --

DR. MAKHIJANI: We have that.

MR. PRESLEY: You have that and ready to go on that.

Comment 4, I've got that you need to look at pages 135 and 136 -- I'm sorry, pages 35 and 36 and page 101 and 102.

DR. MAKHIJANI: I'm sorry. I don't have, on four I just have an item to send a correction on the oro-nasal breathing. That's all I have.

MS. MUNN: And I had a note that new reports were going to be reviewed and OCAS' response is going to be expanded.

MR. ROLFES: Yeah, we'll take a look at the Nuclear Reactor Development Station particle issue and prepare something to expand our discussion on the potential for ingestion of hot particles.

MR. CLAWSON: Well, that's really, if I remember right, this, this really wasn't an oro-nasal issue. It was more of a large particle ingestion.

DR. MAKHIJANI: Right, that's the correction

that I needed. Other than that was there an action item for us in terms of reviewing?

MR. ELLIOTT: Review what we send you.

DR. MAKHIJANI: Like the Rad Safe reports or something? I'm not clear. I didn't have anything written down.

MS. MUNN: That's because we didn't give you any. I don't believe so. My notes didn't show anything. They just showed that Mark was going to expand the level based on the review.

MR. CLAWSON: I thought SC&A was going to review it.

MS. MUNN: Well, this is, the oro-nasal breathing thing is gone completely. That's not there. We've reworded the comment, and because we reworded the comment and because it's response is adequate but needs to be expanded because of the new material, there really isn't any issue, I think, with SC&A because it's done.

MR. PRESLEY: Well, I've got down apparently that 135, 136 is a note that I put in there for something else. It says Mark is to revise the content or the comment on hot particles, and we're going to change the title of this

thing to --

DR. MAKHIJANI: Actually then if the words due to oro-nasal breathing can be deleted, I think Jim suggested that earlier. If we could just all delete, then this action will be done.

MR. PRESLEY: Right, and then I have I marked it complete.

Five then is two pages.

MR. ROLFES: We received some comments from SC&A on Gene Rollins' ambient environmental intake model, and we were going to wait to get that to SC&A in an approved-type profile document. However, we're going to address their comments in a new white paper revision, so that is our action item to get to.

MR. PRESLEY: Item six then.

MR. ROLFES: Same thing.

MR. PRESLEY: Same thing, and it's the same thing with seven, white paper.

Eight is complete.

Nine is also complete.

Ten --

MR. ROLFES: I don't have any action items written down on this.

MR. PRESLEY: Yeah, I've got ten marked complete.

DR. MAKHIJANI: Ten I have written down that you asked us to review the page changes.

DR. ROESSLER: Yeah, page 42 is what I circled here.

MR. PRESLEY: Page 42? Okay.

Page 11 or Response 11, we're going to send page 77 and 78 on the site description, and you should have that.

DR. MAKHIJANI: We have that.

MR. PRESLEY: You're got that.

MR. ROLFES: They're going to take a look at, and I guess the tables that I mentioned, C-1, C-2 and C-3 which are the job matrices that give indicators of potential for exposure.

DR. MAKHIJANI: And we're also to look at those environmental dose pages that we didn't look at before.

MR. ROLFES: These are in the external dose portion of the TBD.

DR. MAKHIJANI: Right.

MR. ROLFES: So it's pages 35 and 36 as well as 101 and 102.

MR. PRESLEY: Twelve, I have no comment on. It's complete.

Thirteen I show is complete.

DR. ROESSLER: I show page 41 and page 52 are going to SC&A.

MR. ROLFES: They'll confirm that we put the bounding calculations.

MR. PRESLEY: Item 14. I don't show any action items whatsoever on that.

DR. ROESSLER: I show that SC&A is going to look at Section 5.6.3 which starts on page 53.

MR. ROLFES: And just to confirm that we have methodology to interpret gross fission product for gross alpha bioassay data in a claimant favorable manner.

MR. PRESLEY: Fifteen, nothing whatever.

Sixteen, I've got it marked complete.

DR. MAKHIJANI: Yes, there's nothing on 16.

MR. PRESLEY: We marked out on OTIB-0017, the reference to OTIB-0017, and I have that complete.

DR. ROESSLER: What are you on?

MR. PRESLEY: Seventeen, we've got response pages on review 49 through 54.

MR. ROLFES: So SC&A is going to take a look

at 49 through 54. Action was?

MR. PRESLEY: I have 18 marked complete.

Nineteen is CDC, HHS, NIOSH and SC&A are going to have a meeting and work this technical call to work this out.

MR. CLAWSON: Hey, Bob, on 18 back there, I thought there was a page insert in that, and I thought that --

MR. PRESLEY: There is a page insert in there.

MS. MUNN: Yeah, page 53.

DR. NETON: Yeah, that's tied in with 17.

MR. PRESLEY: They will get 53, 49 through 54 in 17.

Twenty, NIOSH to look at coworker tables and non-use of badges, and come up with a write up to the Board on your findings on that.

DR. ROESSLER: Before 1966.

MR. PRESLEY: Before 1966.

MR. ROLFES: So just to confirm we are talking from 1951 through 1966. So, it's external dose.

DR. NETON: Yeah, I thought we were looking at '63 to '66.

MR. ROLFES: Do we need to clarify that?

MR. PRESLEY: Well, --

DR. NETON: Right, but Arjun pointed out we are doing dose reconstructions prior to ’63 for external so to some extent -- I don’t know, I --

MS. MUNN: I thought the whole object here was to try to --

DR. NETON: Our only option before ’63 is to say we can’t do it, and there’s no recourse for any of those people. So to some extent those are partial dose reconstructions the best we could do.

MS. MUNN: ‘Sixty-three to ’66.

DR. NETON: Otherwise we --

DR. MAKHIJANI: John, do you agree with that?

DR. MAURO (by Telephone): I’m sorry. I was looking at something on my e-mail. Could you please repeat the question?

DR. MAKHIJANI: All right, I signed off for you. It’s okay.

MR. ROLFES: Never mind.

MR. PRESLEY: Twenty-one, I have a response that NIOSH will look at and make remarks on

OTIB-0017.

MS. MUNN: And it may not be necessary there.

MR. PRESLEY: Twenty-two --

DR. MAKHIJANI: Mr. Presley, sorry, I missed what you said there.

MS. MUNN: Response 21, NIOSH is going to check and see whether or not OTIB-0017 really is appropriate.

MR. PRESLEY: Twenty-two, NIOSH to get the response to SC&A on neutron dose data up to 1979.

DR. ROESSLER: How about ’66?

MR. ELLIOTT: How we assign dose up to ’66 and then do we have enough neutron dose to use beyond ’66 to ’79?

MR. PRESLEY: That’s correct.

DR. ROESSLER: Yeah, that was it.

DR. MAKHIJANI: These are the 200 claimant files.

MR. ROLFES: Yes, the analysis of the 200 claimant files, we can take a look at those.

MR. PRESLEY: Twenty-four, I have complete, and I also have that you’re to send page 51 of the 5.6.1 to SC&A for review.

And 25 we've marked complete. That takes care of the matrix. Now, does anybody need to take a short potty break because we've got about 50 minutes here before some of us have to go. We have, SC&A has, they have --

Arjun, what do you want to call these?

MISCELLANEOUS ITEMS

DR. MAKHIJANI: Well, as I mentioned, we were not doing a complete review, but I had, since it was a complete rewrite, I asked the team that was working on it to read through the whole TBD because how to do a review of something if you don't know where the relevant items are going to be.

And so these other items were miscellaneous items that were sent to me by various members of the team. So I collected the relevant ones and suggested, and just included them as comments, not as findings, for NIOSH in case you wanted to do anything with them. I'm not presenting them as findings. It's up to you how you want to deal with them.

MR. ELLIOTT: Have we studied these at all?

MR. ROLFES: These other comments, yes. We

have, in fact, seen these. These are still on the six-page matrix that we have. We're just in the process, many of these comments were on the external dose TBD that was released shortly before the last meeting, and we just, we're still in the process of actively putting together supplementary information to address these comments. We just had Richard ^ prepare some additional responses, and he's going to be working on some of these I believe. Anyway, if you'd like to go through them, I'd be happy to respond and also to see if we could have Gene, Gene might be able to give some additional details of our path forward to address these other comments.

MR. ELLIOTT: I just wonder if that's not premature.

DR. MAKHIJANI: Well, I think they're a matter of record. I mean, we can read them into the record. I don't know what the status of this document is.

DR. NETON: We're not able to close these out completely in any sense.

DR. MAKHIJANI: No.

DR. NETON: ^ passing them out.

MR. ROLFES: Yeah, we haven't, we're aware of the issues and given the time constraints, we prepared for this meeting in a very short amount of time. I mean, we had about a week to prepare for the meetings.

MR. ELLIOTT: I think it would be appropriate to read them into the record, and if we have any need of clarification, now is a great opportunity for us to get that. I don't think we're at the point where we're ready to expound upon how we are going to address each or any of them.

DR. WADE: Remember, SC&A is offering these as comments, not as findings.

DR. MAKHIJANI: Yeah, and we weren't expecting responses one way or another.

DR. WADE: So we appreciate it.

MR. ELLIOTT: Again, this goes to our listing. We list them. We're going to hear, and then we're going to act.

MR. ROLFES: We can just let Arjun go ahead and read his comments, and we'll provide our --

MR. PRESLEY: Arjun, go ahead and let's read your comments, and then, Mark, we'll require

or provide a response that they've got. But let's remember, people have to get out of here and there's nothing that we can really do about these today other than read them into the minutes and –

MR. ELLIOTT: And if we need any clarification we can ask for that?

MR. PRESLEY: That's correct.

DR. MAKHIJANI: Okay, let me do this as rapidly as possible.

The first comment: Despite the fact that this procedure could overestimate low energy photon dose, this approach to film dosimetry is invalid as a relationship between optical density and exposure is non-linear. That optical density must be converted to exposure prior to performing any subtraction. Thus, an incremental beta dose that is measured by the film emulsion on top of the gamma dose may lead to an underestimate of the beta dose.

MR. ROLFES: And the NIOSH response is that we're going to review the dosimetry approach.

DR. NETON: I don't think we're going to get involved in all responses.

MR. ELLIOTT: Unless we have a clarification.

DR. NETON: Unless we have a clarification.

DR. MAKHIJANI: And the second comment was we just pointed out some small errors and editorial issues that need correction.

The third –

DR. ROESSLER: The units might be significant for --

DR. MAKHIJANI: They are listed in the --

DR. ROESSLER: You've got them marked --

DR. MAKHIJANI: We have them marked so they can correct if they agree.

Third comment: Table 6-8 is not a complete list of radionuclides released during vents of underground explosions. A more accurate and complete list has been given in Hicks 1981, which is in the list of references of the documents we reviewed.

The fourth comment: SC&A's site expert, Lynn Anspaugh, informed SC&A that he has been told that the potential for noble gas exposure during tunnel re-entries was not limited to radiation technicians and miners which is in disagreement with the End Note 22

in the site profile on page 61. According to Dr. Anspaugh, re-entries involved electronic technicians and other laboratory personnel as well as supporting crafts persons. Interviews with person who were actually present may help clarify this issue.

Fifth comment: The status of the dose reconstruction record of NTS employees who were assigned to the Tonopah Test Range is unclear. ORAU 2007 -- that is that TBD -- states that Sandia is, quote, the custodian of TTR dosimetry records.

MR. ELLIOTT: There should be an end quote there somewhere.

DR. MAKHIJANI: However, there is no discussion in the TBD of how these records have been integrated into NTS employee records and whether TTR doses are being properly taken into account.

And the sixth comment was about National Lab and NTS dosimetry records, and it's a little bit cryptic for me, and I don't know. I'll just leave it at that because that's what's in the matrix. I don't remember what's in the detail. The detail of this may

be how they meshed together which maybe Larry addressed earlier.

MR. ROLFES: I think we spoke to that a little bit already.

DR. MAKHIJANI: Yeah, right, I think Larry did as well.

Seventh comment: Table 2-2 from Volume 2 of the TBD -- that's in the old volume -- has been referred to several times in your site profile revision. However, it has been noted that this table does not provide a complete list of relevant radionuclides which problem should be corrected. External dose TBD should use a table with a complete list of relevant radionuclides.

Eighth comment: Table 6-10 is confusing and should be clarified as to the connection with the standard value for relative biological effectiveness.

Ninth comment: Table 6-13 states that photon doses are indicated for atmospheric safety test areas although test number four ^, and data should be included in this table for that event. Also, there were other such tests

on the Tonopah Test Range, use of either the ^ plain surface or soil contaminated to an infinite depth is not appropriate for fallout.

^ notes that exposure factors derived by ^ 1980 for exponentially distributed^ sources. ^ exponentially distributed source are more appropriate, but such factors are not used here^. The ^ for beta contamination for 60 tests in Table 6-14 is not appropriate for the same reason.

Tenth comment: On page 91 there's a comment about low humidity is not valid for tunnel workers.

And eleventh comment: Section 6.4.1.1 of the TBD contains Table 6-11 which lists 50 percent and 95 percent annual doses for 1945 through 1957. These doses are based on site-wide averages. It's not clear why such a broad-brush approach is being used. The consequence of this approach is that the claimant may have their assigned dose diluted, especially in the years when testing did not occur.

Although it is not clear from the TBD, ^ activities involve exposure to the radiation

^ no tests. For example, visits to previously contaminated ^ involving radiation radiography, ^ handling, et cetera, may have occurred during ^. Data should be refined to be job or location specific.

And the last comment: Ignoring beta dose is only appropriate in a minimum efficiency approach for a case that will be compensated. This is not made explicit. The language in the above statement should be clarified to state that the zero electron doses are a reasonable approach only for minimal dose calculations in compensable cases.

And those were the comments.

MR. ELLIOTT: I don't think we have any questions for clarification.

DR. WADE: We're done. Do you want to talk a little about when you'll meet again or --

MR. PRESLEY: Well, I guess we need to. Now, as I see it, SC&A, number one, they have quite a bit to do to get these pages, and so does Mark, because he's got some of the stuff to come up. We're going to try to put this thing on the table in Nevada. Is that

correct, Lew?

DR. WADE: Yes.

MR. PRESLEY: As I see it, once everybody gets everything looked at, if there's a possibility maybe with us getting together the first of January. Let's see, we go to Nevada --

DR. WADE: The 8th, 9th, 10th.

MR. PRESLEY: What?

DR. WADE: Eight, nine, ten.

MR. PRESLEY: Eight, nine, ten. I'm wondering if it's a possibility that we might get together on a conference call some time the week before that. I realize that's not much time for everybody to, if we've got a problem or anything like that to go back and respond to it. Either that or the week before Christmas I have wide open.

DR. ROESSLER: I'm committed that week, the week before Christmas. And when you talk about the week before Nevada, you're talking about the first few days in January? Somewhere in there?

MR. ELLIOTT: Second through the fourth.

MR. PRESLEY: Yeah, 2nd, 3rd and 4th. We've

got a Procedures working group in Cincinnati December the 11th.

MS. MUNN: Yes, we do.

MR. PRESLEY: Wanda will be here. I will be here.

DR. ROESSLER: And I'll be in San Antonio for a Society for Risk Analysis meeting that week. But the week before Christmas I could be available for a conference call. How long do you think the conference call might take?

DR. WADE: We'll try for December 19th?

DR. ROESSLER: What?

DR. WADE: December 19th for a conference call.

MR. PRESLEY: We had that date set up before.

Wanda?

MS. MUNN: Oh, yeah, sure.

DR. WADE: Wanda enthusiastically endorses.

DR. ROESSLER: Can I call from the beach in Florida?

MR. ELLIOTT: What about December 4th? Can we have all our stuff done by then? Is that a good, I mean, that moves everything up I know, but --

MR. ROLFES: Gene, how do we feel about having things? Do we think we can resolve the outstanding issues on the fourth, by the fourth of December?

MR. ROLLINS (by Telephone): If we don't have them resolved, we can certainly have a path forward.

DR. ROESSLER: But SC&A needs some time.

MR. ELLIOTT: It's got to be delivered before the fourth so it can be digested.

MR. PRESLEY: Yeah, it's got to get to them so they've got time.

MR. ROLFES: It cuts down our amount of time.

Gene, how long do you feel that some of these items might require in order to respond?

MR. ELLIOTT: Well, if we can finish it by the fourth, can we, the 19th looks more reasonable then.

MR. ROLLINS (by Telephone): These activities are going to require a good bit of data capture. I don't really have a feel for how easy that's going to be to do.

MR. PRESLEY: Can we shoot for the 19th, and

if it doesn't come about, then we'll back up and punt? My only other thing about this is we are to be there Tuesday, Wednesday and Thursday. There is a possibility that we could do like we did before and have a Monday, the 7th, meeting to discuss and cuss and possibly come up with a recommendation.

MS. MUNN: I can do that.

DR. ROESSLER: I like that.

MS. MUNN: That ought to give everybody enough time to do what they need to do.

MR. PRESLEY: I think I can travel on the 6th of January if I have to. There's something in there, and I don't have it on my calendar. I'm sorry, but I think I can travel on that Sunday.

MS. MUNN: There's a lot of direct flights to Las Vegas. You can catch a morning flight and be there well before noon and have an afternoon/evening session.

MR. PRESLEY: We could do that. So we're going to, let's shoot for the 19th, a conference call.

Larry, can you set that up, please?

DR. ROESSLER: We're going to do both?

MR. PRESLEY: Let's see if we can knock this thing in the head with a conference call on the 19th. If not, then we'll meet on the seventh in Nevada.

DR. WADE: So that's tentative.

DR. ROESSLER: So we really can't make airline reservations or anything until we know. Or we could make them and change them.

MR. PRESLEY: Make them and change them.

DR. WADE: We'll be booking a hotel room. I guess we'll have to so if we change we just have a hotel room we can all go to.

MR. PRESLEY: Wanda, eleven o'clock eastern standard time?

MS. MUNN: Eleven o'clock will be fine on the 19th.

MR. PRESLEY: That all right with everybody else?

MR. ELLIOTT: Yes.

DR. WADE: And then if we go on the seventh, we'll do it mid-day so people can travel in that morning.

MR. PRESLEY: If we have to. Start at noon.

DR. WADE: Okay.

MS. MUNN: Start at nine if we do it on the

seventh?

DR. WADE: Noon.

MR. PRESLEY: We will supply supper if we run over. How's that?

MR. ELLIOTT: But the 19th you're starting at 11?

DR. WADE: Say again, Larry?

MR. ELLIOTT: But the 19th you're starting at 11 a.m. teleconference.

MR. PRESLEY: Eleven a.m. eastern standard time.

DR. WADE: The seventh tentatively at noon Las Vegas time.

MR. PRESLEY: Make sure if we're at the Westin that we get the big room, please, and they don't put us in that stage again like they did.

DR. WADE: Yeah, that was pretty mean.

MR. PRESLEY: That was awful. Does anybody else have anything?

DR. WADE: No, thank you all very much. We're going to cut the phone call now. Thank you for your patience on the phone, your perseverance. You're good people.

(Whereupon, the work group meeting adjourned

at 3:00 p.m.)

CERTIFICATE OF COURT REPORTER

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I, Steven Ray Green, Certified Merit Court Reporter, do hereby certify that I reported the above and foregoing on the day of Oct. 25, 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 26th day of Sept., 2008.

_____

STEVEN RAY GREEN, CCR, CVR-CM, PNSC

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