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 August 7, 2007.

STEVEN RAY GREEN AND ASSOCIATES
NATIONALLY CERTIFIED COURT REPORTERS
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C O N T E N T S

August 7, 2007

TRANSCRIPT LEGEND

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

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

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

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

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

(By Group, in Alphabetical Order)

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BRANCHE, CHRISTINE, NIOSH
ELLIOTT, LARRY, NIOSH
HARRISON-NAPLES, MONICA, ORAU
HOWELL, EMILY, HHS
KATZ, TED, NIOSH
KOTSCH, JEFF, DOL
MAHATHY, MIKE, ORAU
MAKHIJANI, ARJUN, SC&A
MAURO, JOHN, SC&A
NETON, JIM, NIOSH
ROLFES, MARK, NIOSH
ROLLINS, GENE, ORAU

P R O C E E D I N G S

(9:00 a.m.)

WELCOME AND OPENING COMMENTS

DR. LEWIS WADE, DFO

Hello, this is the work group conference room. This is Lew Wade. John Mauro, can you hear me?

DR. MAURO (by Telephone): Yes, I can.

DR. WADE: We'll begin the meeting now. Hold on for a second. So the court reporter is here and functioning. This is a meeting of the work group that is focusing on the Nevada Test Site site profile. It's ably chaired by Mr. Presley; members Munn, Clawson and Roessler. All of the work group members are here in the room.

Might I ask if there are any other Board members who are on the telephone? Do I have any other Board members participating on the telephone?

(no response)

DR. WADE: Any other Board members?

(no response)

DR. WADE: I take it that we do not have a

quorum of the Board which is appropriate. We wouldn't be able to have a work group meeting if we had a quorum of the Board. So again, we can begin.

What I'll do is we'll go through introductions. And the way we'll do that is we'll go around the table here, and then we'll go to those people participating. I'll start by asking for members of the NIOSH and ORAU team who are on the line.

I'll then ask for members of the SC&A team who are on the line, then any members of Congress or their representatives who are participating. Then if there are workers, worker representatives, petitioners, claimants who are on the line, and then anyone else who would like to be identified.

When I ask for Board members, NIOSH, ORAU, SC&A folks to identify themselves, I'll need you to identify whether or not you have any conflicts relative to the Nevada Test Site. That's the technical area that we're looking at today. So we'll start here going around the table.

My name is Lew Wade. I have the

privilege of being the designated federal official for the Board. I work for NIOSH, and I have no conflicts relative to this site.

MR. PRESLEY: Robert Presley, NTS Work Group Chairman, no conflict.

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

MS. HOWELL: Emily Howell, HHS, no conflicts.

MR. ROLFES: Mark Rolfes, NIOSH Health Physicist, I have no conflicts.

DR. ROESSLER: Gen Roessler, member of the Board and the NTS work group, no conflict.

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

MS. MUNN: Wanda Munn, Board, no conflicts.

MR. CLAWSON: Brad Clawson, Board member, no conflicts.

MR. ELLIOTT: Larry, Elliott, NIOSH, I have no conflicts for NTS.

DR. BRANCHE: Christine Branche, NIOSH, no conflicts.

DR. WADE: That’s all of us in the room. I would hope that you could hear each of us as we spoke. Again, if you had any problems, let us know when you have that problem.

I'm sorry. Now we're going to go to the back of the room.

MS. HARRISON: Monica Harrison-Naples, ORAU. I have no conflicts for NTS.

MR. MAHATHY: Mike Mahathy, ORAU, no conflicts for NTS.

DR. WADE: Now we're going to go out to the telephone and ask for members of the NIOSH or ORAU team who are on the line to identify themselves. Any other NIOSH or ORAU people on the line?

(no response)

DR. WADE: Any members of the SC&A team on the line?

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

DR. ANSPAUGH (by Telephone): This is Lynn Anspaugh, consultant to SC&A. When I was employed at Lawrence-Livermore, I did spend a lot of time doing experiments at the Nevada Test Site.

DR. WADE: Thank you.

Other members of the SC&A team?

(no response)

DR. WADE: What about other federal

employees who are on the call by virtue of their federal employment?

MR. KOTSCH: Jeff Kotsch, Department of Labor.

DR. WADE: Welcome, Jeff.

MR. KATZ: Ted Katz, NIOSH.

DR. WADE: Other feds?

(no response)

DR. WADE: Members of Congress or their representatives?

MS. (UNINTELLIGIBLE): Hi, this is Cathy (unintelligible), representative for Senator Harry Reid.

DR. WADE: Thank you for joining us.

Any other congressional staff or members?

(no response)

DR. WADE: Are there any workers, worker representatives, petitioners, claimants who would like to be identified?

(no response)

DR. WADE: Anybody else from the Nevada Test Site who would like to be identified?

(no response)

DR. WADE: Is there anybody on the line who

hasn’t given an introduction that would like to be identified for the record?

MS. GLENN: This is (unintelligible) Glenn.

DR. WADE: Thank you.

DR. NETON: I’m going to mention that Gene Rollins from the ORAU team will be joining us on the line around 9:30.

DR. WADE: Thank you.

Anyone else who would like to be identified?

(no response)

DR. WADE: Before we begin let me talk to you a little bit about phone etiquette. Again, it’s important that the work group does its business with the possibility of others joining by telephone. That increases the capability of the Board to conduct its business. But for that to work it’s important that you on the line exercise a bit of phone etiquette. If you’re not speaking, mute your phone if at all possible so that we don’t hear background noises.

If you are speaking, speak into a handset and not a speaker phone. Be mindful of the fact that background noises can be very

distracting to others when they might be second nature to you. So think about your situation and try and manage it so that all of us can have as productive a meeting as possible.

Anything else that needs to be said on introduction?

(no response)

DR. WADE: Robert, it's all yours.

INTRODUCTION BY CHAIR

MR. PRESLEY: What I would like to do is start out and go through the matrix. I'm going to ask Mark Rolfes if he would kick it off, and let's start with one and go through each one. I realize it's going to take some time, and that way we can go through and mark the ones that are complete. If SC&A has comments or if CDC has comments, we can discuss those, but what I would like to do today is when we come to a conclusion on each one of these issues, mark it complete, and let's move on.

INCOMPLETE RADIONUCLIDE LISTS

MR. ROLFES: The first comment that we received from SC&A's review was that some

radionuclide lists are not complete. Our response, NIOSH's response to this was that the Nevada Test Site TBD Table 2.2 was revised to include Chlorine-38, Aluminum-28 and Scandium-46. Other tables that identify radionuclides of concern were reviewed, but no additional changes were made to the TBD.

We've added a note to chapter 5 indicating that REECo reported radionuclides for identification or dose concern versus the time test for various operations. These radionuclide lists may not be comprehensive, but the lists have been reproduced, and this TBD is published by REECo because they reflect REECo's historical account of the radionuclides of concern during the testing era.

Table 2.8 has been removed from the TBD because of the special exposure cohort designation for workers involved in atmospheric testing from the early 1950s through the end of 1962. NIOSH believes that adding this additional information to Tables, 2, 3 and 5d-13 is not appropriate at this time.

And also, NIOSH has completed or the ORAU team has completed a working draft of the chapter 5 revision and incorporated these updates. And this is currently in review at this time.

MR. PRESLEY: Does anybody have any comments or questions about Comment 1?

DR. ANSPAUGH (by Telephone): I would like to make one comment about that. It seems like this draft material that we have on ambient environmental intakes has greatly expanded this list well beyond what is stated here.

MR. PRESLEY: Sir, can you give your name?

DR. ANSPAUGH (by Telephone): I'm sorry. This is Lynn Anspaugh.

And I would also like to make a general comment that I think given the extensive revision on this ambient environmental issues that perhaps this table of comments and so forth, the matrix, may not be appropriate any more.

MR. ROLFES: True, much additional information has been compiled in the ambient environmental intakes at Nevada Test Site based on air sampling and soil contamination

data. And this was a paper that was put together by Gene Rollins, and I'm going to have to defer to him. He should be available in about ten or 15 minutes with us on the phone. I'd like to go through in detail what was done if we could just delay it for approximately 15 minutes.

MR. PRESLEY: Let's do that, please.

DR. MAURO (by Telephone): This is John Mauro. In a related matter, I noted over the weekend that the external dosimetry section has also been revised. I haven't read through it all, but I did notice that it does represent a substantial change. So one of the things that might be worth discussing is, from the big picture, the fact that Gene Rollins has the new report that, I guess, dated July 29th and the revision to the external dose dated July 30, both documents of which we did our best to review.

And in fact, Arjun and myself and Dr. Anspaugh did have a chance yesterday to sort of collect our thoughts. So I think this may have this perspective of what this means with respect to the matrix might be important. So,

yeah, I'd like to second that.

DR. MAKHIJANI: John and I talked yesterday morning. This is Arjun. John and I talked yesterday morning about what comments we could make at this meeting given there's a lot of very complicated paperwork and a lot of new information. Like the external dose information is completely redone. And so one had a chance to really bring a considered opinion on a lot of these issues. So I don't know, Mr. Presley, how you might want to proceed in that light in case we have, if you want us to look at this material then we might have comments at a later time or -- so we're a little bit unclear as to what the process is going to be.

MR. PRESLEY: Well, my thought on a lot of this stuff is we beat it to death. If the rest of the working group thinks that we need to spend more time on this, we can, but I would like to see what you all think about your comments.

MR. CLAWSON: I'd like to weigh in on this. We've got a ton of new information that's come in. They've completely redone this whole

thing, and to tell you the truth, I haven't even had an opportunity to be able to review even a portion of this.

And for me to be able to make a decision on something like that -- this is Brad by the way -- I don't feel good about it. They've -- we've done everything. So I'd say that we need to have a chance for them to be able to make their comments, look back at it and go from there.

DR. MAURO (by Telephone): Brad, this is John Mauro. One of the things that we talked about yesterday -- I say we, Arjun, Lynn Anspaugh and myself -- is that one of the things that could be very valuable, and that we could accomplish today in addition to closing out items, of course, going through the matrix, and taking things that we can take care of, is to make sure that we do understand the new material that came out, the genomes write-up and what it is, and does it, in fact, I guess, replace previous material that we discussed before.

For example, previously we were talking about mass loading approach, and now

we're talking about a different strategy, whether or not they complement each other. So there's a lot for us to talk about I think with respect to the new material that just so we understand it.

Not that we're in a position right now to be critical or to make any informed commentary, but I think the thing that we feel would be valuable is for all of us to fully appreciate what the new material is, understand what the new direction is that is being taken in this new material.

MR. ROLFES: As far as the update that was made to the external dose TBD, much of the information came directly in response to SC&A's previous comments, and we've incorporated information into the TBD in order to directly address the comments that we received previously at previous working groups. I believe a couple of the additions were approaches for addressing personnel that might not have been monitored during certain time periods and performing certain job duties.

And in order to address that issue, we

have incorporated a coworker dose table with some instructions to the dose reconstructor on identifying personnel that were potentially unmonitored and how to assign dose to those personnel. That was the biggest change that I recall in the external dose TBD.

MS. MUNN: This is Wanda. John and Arjun, my understanding as I was reading through these documents and going back to our most recent review of the matrix, which I have dated 4/18/07, my understanding was that these were actions that were in response to the original comments in the original issues that we had discussed when we were going through that matrix for about the third or fourth time back in April. So I guess I don't see this as a new approach necessarily. I thought these were in response to your comments and requests for inclusion.

DR. MAKHIJANI: Let me just give you an example of there was no beta monitoring or rather there was no measurements from the badges that were worn up to 1966. So there's no beta dose information in individual worker records, and we pointed that out. That's an

item in the matrix.

And now in response to that NIOSH has proposed a quite complex method for beta dose calculations. It's in this TBD in Section 6.4. This is the first time that NIOSH has actually proposed a beta dose model because it was not there in the original TBD.

Now at the pleasure of the working group you could accept just the model without review or ask us to review it or review it yourselves, and that's always been my understanding anyway that when NIOSH puts more material on the table that the working group would have the option of just accepting it, reviewing it or asking us to review when there were major new items. And the difficulty is that there are major new technical elements in the new work. I don't know if Mark would agree or Jim would agree.

DR. WADE: This is Lew Wade. Let's sort of categorize what we have here. We have our normal process where, I mean, SC&A reviews a body of work and offers comment. The work group discusses it. Based upon the work group comment, NIOSH makes some modifications and

the process continues. It seems that what we have here is that, and there's no bad people involved in here. What we have is a major quote-unquote response by NIOSH to the work group process that has resulted in certain documents that are relatively fresh.

My sense is that we should discuss those documents today, understand what they are, and then the work group can decide whether or not they want SC&A to actively review them as part of this iterative process or whether the work group is satisfied with what it has. And I think that's just where we are, and it's where we're supposed to be. Does anyone disagree with that categorization? Is that correct, Mark?

MR. ROLFES: That's fine with me.

DR. WADE: So just so I understand, there are two major documents. We have the ambient environmental intakes dated 7/29.

MR. ROLFES: Yes, sir.

DR. WADE: And then the external dose TBD, and the date on that is?

MR. ROLFES: 7/30/2007.

DR. WADE: So these are both extremely fresh

documents.

MS. MUNN: And I do not have a copy of the external dose document. I don't know why I don't.

MR. PRESLEY: I don't either.

MS. MUNN: So if we don't have a --

DR. WADE: External dose TBD.

MR. ELLIOTT: Didn't we send that out e-mail?

MR. ROLFES: I'm sorry?

DR. WADE: External dose TBD.

MR. ROLFES: I don't believe it has been sent out by e-mail, no.

MS. MUNN: So that's why we don't have it.

DR. WADE: Can I get it printed out and distributed?

MR. ROLFES: I don't have it with me. We do have a person with, Mike Mahathy has a copy of it in electronic format, and he can print it out if we can --

DR. MAKHIJANI: I can also e-mail it to everybody, or you can.

MR. ROLFES: I have a computer but no internet access.

DR. WADE: What's the work group's pleasure?

Do you want to receive it electronically, hard copy or both right now?

MS. MUNN: We'd like to receive it hard copy right now and electronically.

DR. ROESSLER: I'd like it electronically right now if you have it.

DR. MAKHIJANI: It's about 120 pages.

DR. WADE: That's okay. So I'm going to set out to get how many hard copies made? One, two, three, four, six copies.

MR. ELLIOTT: I wonder if it would be better if we used the electronic version from Mike instead of breaking that apart. I'm worried they're going to break that apart on you, Arjun.

DR. NETON: It should be out there on our website.

MR. PRESLEY: You say it's on the website?

DR. NETON: It should be.

DR. WADE: So then with documents in hand we can have a brief presentation of the two documents so people could understand what's in front of them, and then you can go through the matrix and look at items and decide whether or not you want to have those documents reviewed

by your contractor or just what your pleasure is as it relates to each item. Is that a plan?

MS. MUNN: That would be much appreciated. Whenever we have a document that is in response to specific questions that have been asked by our contractor, it's helpful if we can simply identify whether or not the question has been answered. Having it re-reviewed to pursue further questions that might arise is impossible to make any judgment about without actually looking at the document itself.

DR. WADE: Now does everyone who needs it have the document, Ambient Environmental Intakes at the Nevada Test Site? That we all have?

MS. MUNN: Yes.

DR. NETON: Now I did say Gene Rollins is the document owner, and he was getting on the phone shortly. So he should be able to communicate pretty clearly what changes have been made to that document.

DR. WADE: He has really two roles to play.

MS. MUNN: Yeah, maybe we can do Gene's

document before we do all the other --

DR. WADE: Gene, are you on the phone? That sounded like your cough.

MR. ROLLINS (by Telephone): Yes, Gene Rollins on here.

DR. NETON: I didn't want to throw you into the fire there, Gene, but since you are the document owner of that external profile, I assume you should be able to discuss both documents then, the external document and the resuspension one.

MR. ROLLINS (by Telephone): I'll certainly try.

AMBIENT ENVIRONMENTAL INTAKES DOCUMENT

DR. WADE: We would prefer that you start, Gene, with the ambient environmental intakes document as the other is being copied for our work group members. So take a moment and collect yourself and sort of walk them through that document. Everyone has a copy of it in front of them.

DR. ANSPAUGH (by Telephone): This is Anspaugh again. I'd just like to ask the question though what the status of this document is. Is it now part of the TBD? Is

it intended to be part of the TBD? Or is it just for information purposes?

MR. ROLLINS (by Telephone): When this document is going to be incorporated into the Technical Basis Document or into a separate technical information bulletin for use in dose reconstructions completed by NIOSH.

DR. ANSPAUGH (by Telephone): Okay, thanks.

DR. WADE: Gene, the stage is yours.

MR. ROLLINS (by Telephone): As I think we're all aware we've been through several iterations including a resuspension model, a mass loading model trying to come up with a method to estimate intakes by workers as they moved about the site. Being a dusty environment we thought that that might be an important pathway, and there was also a question about ingestion.

So this paper attempts to address that. And the way I decided to go about it was rather than build a model, be it a resuspension or be it a mass loading model, I felt it was better to fall back on the plethora of air sampling data that we have available to us.

As you notice in the first part of chapter four, there's a summary in there of air sampling monitoring that was reported in the annual environmental reports from 1971 through 2001. And these data include air monitoring for Plutonium-239, -238 in some of the later years. Tritium, I went through the tritium and there was nothing of any dose consequence there so you don't see too much about the tritium in chapter four.

But I did summarize the plutonium data, and it was provided for most of the areas, and this data was actually gathered to estimate what workers in the field might have been exposed to it. So I thought the data was useful in that it was an attempt to monitor the atmosphere that the workers would have been exposed to. That was the reason they were collecting most of this data. There were some control stations, but this data that was summarized in the chapter four was mostly involved with working conditions.

So in response to one of your comments that we needed to go back -- well, let me just continue on with the plutonium for right now.

So what I did was I went through in this paper, and I looked at all the areas and determined maximum concentrations. These are annual averages. In some cases it was maximum values that were averaged. In other cases it was average values that were averaged over each of the years for each of the areas. That information is summarized in Table 2-1, and that's picocuries per cubic meter.

The next step would be just to take that to 2,600 cubic meters per year which is what we used for annual ventilation rate. And you can come up with Becquerels per year that someone might have been exposed to. That information's provided in Table 2-2. This was information that was previously provided in the TBD for information and for comparison at that time to the other models that I developed subsequently in a check.

DR. MAKHIJANI: Two-dash-one is average or maximum?

MR. ROLLINS (by Telephone): Well, it's both. It's both. If you read, let's see, from 1989 through the year 2001, those values, the concentration values, represent average of

average concentrations that were reported. It was just a way that they changed how they recorded the values in the annual environmental report. There's no slight of hand going on here. It's just how the data was presented.

MS. MUNN: And, Gene, this is Wanda. There's nothing in there any higher than the third power, right? The highest dosages that I saw.

MR. ROLLINS (by Telephone): Well, I think you'll find that the highest concentration, and therefore, the highest intake occurs in Area 9 in 1972.

MS. MUNN: Right, that's what I see. Thank you.

MR. ROLLINS (by Telephone): For 1971 through 1988, excuse me, from 1971 through 1988, those are averages of maximum values, and then from 1989 through 2001, they started reporting average values for each of the areas. And so what you see there for those years is average of the average value. But as it turns out, the way I'm going to apply this or proposing to apply it, we're going to be

using that value for Area 9 in 1972, which is an average of maximum values for the year.

DR. MAURO (by Telephone): Gene, this is John Mauro. So that number in Table 2-1 for Area 9 for 1972, which is 4.3 times 10 to the minus 3 picocuries per cubic meter, if I am, if I understand this, that's one of the things I was hoping to accomplish here is so there were a number of measurements that were made in Area 9 in 1972.

I guess if we can go into the dataset, we'd see them. Are we talking about these are continuous measurements that were made, are these short-term measurements? And were they made at the same time and same location that the workers were working?

MR. ROLLINS (by Telephone): They were made at the same time in the same location where workers were working, and, John, I don't have the information available to me, but I'm sure I can find it. Typically, when you do area monitoring like this outdoors, it's continuous, and they change the filter papers out on some kind of schedule.

DR. MAURO (by Telephone): And so out of

those, let's say there were 56 samples collected or whatever, each one was separately evaluated, and this is the highest of all the ones that were collected?

MR. ROLLINS (by Telephone): Right, that's what the annual environmental report, the way they reported it and talked about in the text, that's what it leads me to believe.

DR. MAURO (by Telephone): That's very helpful to me because I just wanted to make sure I understood that number.

MS. MUNN: Now the highest inhalation intake for 239 anywhere is 1972, Area 9, less than half a Becquerel, right?

MR. ROLLINS (by Telephone): Correct.

Now, here comes the problem that we've been wrestling with for some time. We know we have measured radionuclide persistent in the soils at NTS, and those radionuclides include Strontium-90, Cobalt-60, Plutonium-238, -239, Europium-252, 54 and 55 I believe, Americium-241, the two plutoniums, Cobalt-60, Cesium-137, Strontium-90, Europium-152, Europium-154 and 155. Those are what was considered to be the radionuclides important to dose that are

persistent in the soils at NTS.

So what I wanted to try to do was to take the air monitoring data and somehow relate it to what intakes of these other radionuclides may have occurred simultaneously. As you pointed out it's not appropriate to use the McArthur data to estimate what was going on back in 1963 or that timeframe. So the first thing I did was take the soil concentrations provided in Table 3-1 for the various areas, and I corrected it back to 1963.

Now Table 3.1 shows the inventory. Table 3.2 shows the aerial soil deposition which is just the inventory divided by the area that was contaminated and then decay-corrected back to '63. And those values are shown in Table 3-3.

Now we get into where I start developing scaling factors. This is Section Four starting on page 11. I wanted to normalize everything to Pu-239 because that's where I had my air sampling data, the most air sampling data available. You'll see in Table 4-1 the scaling factor, of course, for Pu-239

would be one.

But when you compare the ratio of 239 to all of the other radionuclides, you can see that the ratios vary depending on what area you're in. So to be conservative I went through for each of the other radionuclides and picked the highest ratio of any of the area and from that developed the scaling factor that I could multiply the intake of the plutonium by to give me derived intakes for the other radionuclides. And that's shown at the bottom of Table 4-1.

Now relating all of the intakes to the plutonium, what you said a little bit less than a half a Becquerel, now I've got values for intakes for all of the other radionuclides.

DR. MAURO (by Telephone): And that would be for 1963?

MR. ROLLINS (by Telephone): Well, it would be the highest value for any of the time periods that we have measurements for.

DR. MAURO (by Telephone): Yes, I understand.

MR. ROLLINS (by Telephone): I mean any of

the areas, but yeah, it's all based on the highest value which happened to be in 1972.

DR. MAURO (by Telephone): No, I understand. No, I'm with you. This is very helpful. Keep going.

MR. ROLLINS (by Telephone): Okay.

MS. MUNN: All done based on the next to the last test or the last test, right?

MR. ROLLINS (by Telephone): Correct.

Okay, actually the next thing I wanted to investigate, and Dr. Anspaugh, I'm glad you're on the phone because this is where your formula or your model comes in for resuspension, and I want to make sure that I understand it correctly. But we seem to all agree that resuspension of the phenomenon that occurs early after deposition or during plume passage and that over time the material that is brought back up into the atmosphere versus what's deposited will slowly decrease and approach as shown in Dr. Anspaugh's formula here. It will approach a value of ten to the minus nine. So it's long time after deposition we're approaching the one-time ten to the minus nine.

DR. ANSPAUGH (by Telephone): With an uncertainty of a factor of ten.

MR. ROLLINS (by Telephone): Okay, but as I go on with this I think you'll see where this uncertainty is going to drop out. Well, it may propagate; it may drop out. Let me just continue with this and show you what I'm trying to do with this.

I wanted to account for the fact in 1963 and maybe 1964 about the fact that what we're seeing out there in the air monitoring data in 1972, for example, may not be representative of what was going on in 1963 which was six months after the last atmospheric test.

And so what I did was I took Dr. Anspaugh's model here, and I integrated it over the time period, basically six months from the beginning since -- the last atmospheric test was in July of '62. So I basically truncated out the first six months of his curve there shown in Figure 5-1, and I integrated it for 365 days starting six months after the detonation.

And then I compared that to an

interval of the constant, one times ten to the minus nine, to determine what the ratio would have been. How much more would you have been expected to see in the atmosphere over that first six month period as opposed to what you would see in 1972.

And I came up with these scaling factors that you'll see, well, actually, it was one factor, and that factor --

DR. MAURO: 3.69.

MR. ROLLINS (by Telephone): Right, you've got it, John. Okay, there it is, 3.69. So what I did there to account for this early resuspension phenomenon was for 1963, I would recommend increasing the intakes that I just calculated in the previous section increasing them all by a factor of 3.69. And that instruction is provided in Table 5-1 where you see I've increased the potential intakes for 1963 versus those for all subsequent years. And that, hopefully, is helping me get my arms around the early resuspension.

DR. MAURO (by Telephone): Could we talk about that a little bit?

MR. ROLLINS (by Telephone): Sure.

DR. MAURO (by Telephone): Or do you want to continue and finish your description?

MR. ROLLINS (by Telephone): Well, we can talk about that. It's probably a good time to talk about that before we go further.

DR. MAURO (by Telephone): Because in reviewing, reading this carefully, that was the one place where I was thinking about how well this will serve us in terms of the resuspension model. And in effect when you look at Dr. Anspaugh's curve, we effectively go from ten to the minus fifth to ten to the minus nine, covering four orders of magnitude over that time period. And I understand what you did. You sort of truncated off of the front end the 180 days which really took off three orders of magnitude.

So in other words during those first 180 days is when you really get a precipitous drop in the resuspension factor so really the difference between the 180-day period after the test, and then, of course, 1972 is really, according to the curve, about a factor of ten. And you integrated and you get the 3.69 as being what I would say the integrated

difference over between I guess, the 180 day and 1972. Is that correct?

MR. ROLLINS (by Telephone): Yes.

DR. MAURO (by Telephone): So now --

MR. ROLLINS (by Telephone): Just for your information if you integrated it from time zero, the factor would be more like 400.

DR. MAURO (by Telephone): Yes, I understand. But I understand why you did not do that because we're picking it up 180 days after the last test.

MR. ROLLINS (by Telephone): Correct.

DR. MAURO (by Telephone): So I understand that.

Now, and these are more by the way of understanding the processes. But if you're in 1963, let's say 180 days after, a person's working, and it's -- they're out there in the field, and it's 180 days after. For that particular year would I be correct to say it would be more likely for that person in that year it was probably more like a factor of ten as opposed to 3.69?

MR. ROLLINS (by Telephone): No.

DR. MAURO (by Telephone): No?

MR. ROLLINS (by Telephone): No.

DR. MAURO (by Telephone): I don't quite understand.

MR. ROLLINS (by Telephone): Looking at the curve, if you go out to 180, like I said, you backed off -- I've got my notes here, John. I did it several different ways trying to be as reasonable, but not being overly conservative. The 3.69 would represent -- and I'm probably going to use incorrect terminology, but for lack of a better term, as I said in the paper, the one times ten to the minus nine is a value that I would relate to a mass loading factor, something that occurs long after deposition.

So if you take the constant and you integrate under that for 365 days, then you get a value. And if you take the early part of this curve starting at 180 days, and then integrate that out to 180 plus 365 -- I can't do that math right now without a little calculator, but it's -- then you compare those two values, you get 3.69.

Which tells me that if you knew how much an individual inhaled in 1972, then you can estimate what he might have inhaled in

1963 once you do the decay correction, of course, based on this curve and the interval of the various areas in comparison to one another. So you've got one interval divided by another interval. That's why I think some of the uncertainties cancel out.

DR. MAURO (by Telephone): So somehow that accounts for this plus or minus factor of ten. That's where I sort of tripped up, and I was hoping to get some clarification.

MR. ROLLINS (by Telephone): It seems to me that both of these intervals would have that same uncertainty in it. In other words our inability to predict exactly what the value might be. But if it's lower, if the actual values are lower than we thought then it would be below on both the numerator and denominator. And if it's higher than what we actually thought, it would be higher in both the numerator and the denominator. So the ratio should stay about the same.

DR. MAURO (by Telephone): Oh, I think I got it. Yeah, I see what you're saying.

DR. ANSPAUGH (by Telephone): I think that's a bit of a leap of faith.

MR. ROLLINS (by Telephone): Dr. Anspaugh, there's always going to be uncertainties in anything that we do.

DR. ANSPAUGH (by Telephone): I wouldn't argue with that, I guess, but how do you best express the uncertainty and still retain your mandate to be claimant favorable?

MR. ROLLINS (by Telephone): I think I started by taking starting with the intakes to begin with and the highest actual value that was ever measured.

DR. ANSPAUGH (by Telephone): Yeah, I understand that if that's the appropriate source term, and we'll get to that later.

MS. MUNN: Well, being claimant friendly doesn't mean that we need to be scientifically unreasonable. There has to be a reason to adapt a philosophy in going forward here, and if your uncertainty is the same in both the numerator and denominator, then I think I understand what Gene's saying.

DR. ANSPAUGH (by Telephone): Right, I believe, Gene, you're saying that if the uncertainty is high early, the uncertainty is also, it's high in the up direction early, it

has to be high in the up direction late, and I don't think that's the way uncertainties necessarily operate.

MS. MUNN: How would you say?

DR. ANSPAUGH (by Telephone): Well, I would treat uncertainty as a random variable. In other words I don't think the, was it 3.69?

DR. MAURO: (by Telephone): Yes.

DR. ANSPAUGH (by Telephone): I don't think that really includes the uncertainty in that number, but I don't want to belabor that too long because I think there are far bigger problems.

DR. NETON: I think, at any rate, we could propagate that uncertainty through if need be.

DR. MAURO (by Telephone): If I may, this is John Mauro. I think really right now all we're really trying to do is get a full appreciation of the rationale of why that was done so that we ourselves can, I guess, discuss it a little bit more. And we have read it and had a chance to talk, but this very helpful because it's starting to clarify exactly what was done and rationale behind it. So I'm right now more interested maybe so I

understand what was done.

MR. ROLLINS (by Telephone): Okay, I appreciate that, John. We can, I would appreciate it if you folks would take some time and think about it. We can discuss how these errors would be reasonably propagated. It might be better to do that after we've had a chance to think about and maybe at a later date. But let me, if it's okay, I can move on with how I handled the early fission and activation products.

DR. MAURO (by Telephone): I'm sorry, this is John Mauro. Before we leave Dr. Anspaugh's curve, one of the questions I asked Dr. Anspaugh yesterday was what does this curve represent? In other words, and I can understand, and certainly, Lynn, you can jump in any time you want.

These are measurements empirically measurements made under a certain sets of conditions where, as I understand it, there was a mild amount of disturbance of the soil. So if you were looking, in other words, if you were trying to say, well, in general, what is a reasonable resuspension factor as a function

of time following initial deposition, this curve, plus or minus a factor of ten, would sort of represent it.

But I also understand that the types of activities that may have been taking place at any one of these locations at any given point in time were very variable and in some cases may have generated quite a large dust loading. And for any given job action that this curve would really not represent that situation.

And I'm not quite sure, I thinking about does everything sort of average out though over the long term so it's okay. But certainly in any given year, let's say at any given location, depending on what they were doing, a given worker in that year in that location could very well have experienced resuspension factors that -- I mean, I'm just going to throw a number up -- that could have been a factor of a hundred times higher for some period of time.

And I'm not quite sure how to deal with that because I'm starting to see the mechanism that you used and how they link.

But then I think about the reality of the worker in the field and whether or not somehow that might have, that kind of transient situation that may have extended for a short or a long period of time at a given location where the activity may have been quite a bit higher for the radionuclides, but perhaps not because you did go with that max number. So that may take care of that.

So bear with me. I'm just trying to understand that if you do have this kind of very erratic dust loading going on during work activities whether or not this curve is going to serve you well.

MS. MUNN: John, this is Wanda again. Do you have an indication that there's a mass loading factor for that area during that period of time that is higher than what's been considered by the work that's been done so far?

DR. MAURO (by Telephone): Yes. I have lots of data on resuspension factors and mass loading factors for a whole broad range of different kinds of activities that take place either outdoors or indoors. And for example,

a resuspension factor of ten to the minus eight, in general, is a pretty low resuspension factor especially if they are even ten to the minus seven is a pretty low value in a place where, let's say, where a vehicle might be driving by, someone may be digging, you know, people are disturbing the soil. And there's empirical data that shows under those circumstances, resuspension factors of ten to the minus four, you know, are not unusual, but, of course, not for very long periods of time.

MS. MUNN: Very brief, sporadic periods.

DR. MAURO (by Telephone): That's correct. So what we got is this interesting dilemma, and I'm trying to come to grips with it is that perhaps over the long term, if a person's working there for ten years -- I'm going to say '63 to '72 -- maybe that doesn't matter, especially since you're assuming that he continuously exposed for 2600 hours per day. So, I mean, all I'm going is trying to settle in to make sure that I understand what was done, and then think about it from the point of view.

Maybe over the long term these differences really all sort of average out and that fact that you're operating off resuspension factor curve that Lynn developed may be appropriate even though over some short periods of time it could be off by orders of magnitude. I guess that's what I'm struggling with, and I'm not quite sure where --

DR. NETON: John, if I remember -- this is Jim. This is exactly where we were at the last meeting.

DR. MAURO (by Telephone): Yes.

DR. NETON: I mean the model's slightly changed here, but this was exactly the issue that we were dealing with the last time we met.

DR. MAURO (by Telephone): And that's when you came up with the five milligrams per cubic meter, and I was real happy with that. In fact, I was the first to say, wow, that's up there because I know five milligrams per cubic meter is a very high dust loading. And to assume that you're operating at that level for 2600 hours per year. It's right in the record. I would say that's certainly up

there, if not off the charts.

MR. ROLLINS (by Telephone): John, what everybody needs to keep in mind is I'm not using resuspension factors to estimate intakes. I'm using empirical data. So don't get too wrapped around the axle about what the absolute resuspension values are because I'm not using those. I'm only using the ratios.

DR. MAURO (by Telephone): Yeah, you're right. That's good. You're right. It's good that you remind us of that.

DR. WADE: Before we move on just for clarification, the only profession would bill for 2600 hours in a day are attorneys.

MR. PRESLEY: Gene?

MR. ROLLINS (by Telephone): Yes.

MR. PRESLEY: This is Bob Presley. We need to keep in mind that in the earlier years at the test site they did not go right in behind another shot and shoot a shot right on top of it. They would go to a clean area and shoot the shot. One of the things that they did out there was they did keep the dust down to a point where a lot of time you'd be working in mud. I think you can agree with me on that.

But, you know, as far as the area being dirty all the time where the people were working or where the bulldozers might be scraping the top layer off to where you could do something, that was not done in a dirty area all the time. Do you agree?

MR. ROLLINS (by Telephone): I wasn't there so I really can't comment, but it's information.

DR. ANSPAUGH (by Telephone): I think what you say, Mr. Presley, is correct, but I would also add that a lot of people have expressed concern about what the shock wave from a shot some distance away and even under ground might have done to temporarily increase the resuspension to a dramatic amount.

MR. ROLFES: Dr. Anspaugh, this is Mark Rolfes. Because of the SEC that was designated for years prior to 1963, NIOSH is no longer going to be reconstructing internal dose for personnel that were not monitored. So the issue of resuspension from a blast wave from an atmospheric detonation is no longer and issue for NIOSH to come up with a solution to.

DR. ANSPAUGH (by Telephone): I'm sorry, you have shock waves from underground shots just as well.

MR. ROLLINS (by Telephone): But would not any resuspension from those have been captured in the air monitoring data?

MR. PRESLEY: Should have been.

DR. ANSPAUGH (by Telephone): Well, maybe, maybe not. You know that's difficult to say. It certainly would not have been captured in '63 through 1970.

MS. MUNN: Why not?

DR. ANSPAUGH (by Telephone): Because there weren't any air samplers.

MR. ROLLINS (by Telephone): He's correct. The air sampling that I have started in '71.

MS. MUNN: But I though we had just been through an exercise where we explain how extrapolation back from all of the areas following that time were defensible.

MR. ROLLINS (by Telephone): We had underground shockwave effects post-1971 that would have been captured by the monitoring data.

MS. MUNN: Yes.

MR. ROLLINS (by Telephone): Would that have been remarkably different than what occurred after 1962?

MR. PRESLEY: It would have been a whole lot less.

DR. ANSPAUGH (by Telephone): Well, probably not if your air sampler was placed in a location where it might have received the benefit of a shock wave, and I doubt if anybody put an air sampler there.

MR. ROLLINS (by Telephone): But it was put in a location where it would measure what people were exposed to which is what we're really interested in.

DR. ANSPAUGH (by Telephone): Well, that's another issue. Where were these samplers place and why? Was it truly because that's where the people were? I really don't know. It's just an issue.

MR. ROLLINS (by Telephone): That's what they said in the environmental report. In fact, we produced some of the language at the very beginning of this report.

MS. MUNN: That would be the logical reason for place them.

DR. MAKHIJANI: Just one technical point in regard to differences in tests between 1963 and 1970 and the post-Baneberry tests is that as I understand it from the Office Technology Assessment report that was done on this and the venting, the test protocols were revised so as reduce the chance of venting because there were a number of major ventings in the early periods.

So that in regard to shock waves and any surface effects from post-'70 tests, they may be different in the early tests because the formulae that were used to calculate the depth of tests and the depth of tests were changed so as to reduce the chances of venting. So I think the tests were conducted at greater depth in the post-'71 period.

Is that right, Mr. Presley?

MR. PRESLEY: Yes.

DR. MAURO (by Telephone): John Mauro, one more question. When these measurements were made of the air concentrations such as the 4.3 times ten to the minus three picocuries per cubic meter, did they also -- because I know we used to do this -- also measure the mass?

That is, how many milligrams per cubic meter were in the air at the time the samples were taken?

And I know you also have information on the number of Becquerels per square meter, Becquerels per gram in the soil. So what I'm getting at is I'd sure be interested in knowing what the dust loading was at the time that these air samples were collected. Is that part of the database?

MR. ROLLINS (by Telephone): It was not included in annual reports.

DR. MAURO (by Telephone): Okay, that would be really interesting because if it turns out, you know, we're looking at some of these numbers, it's also fairly high dust loadings. I would say that will give me a degree of comfort. So I can say, oh, when you got these high readings because a lot of dust was being kicked up, and it's up there in the range where in my world, you know, here in the milligram per cubic meter, the dust loading range, you're up there. It's unlikely you're going to get much higher than that, especially not for prolonged periods of time. And I

would just be interested in seeing that data if it exists.

MR. ROLLINS (by Telephone): I can inquire and find out whether or not that type of data would be labeled. I agree with you; it would be very interesting.

DR. ANSPAUGH (by Telephone): I think that there are research data on, not part of this routine surveillance monitoring, but there are research data on this issue and the long-term average mass loading at the Nevada Test Site is not nearly as high as you might think. It's less than 50 micrograms per cubic meter.

MR. ROLLINS (by Telephone): Dr. Anspaugh, wasn't the development of your model based on empirical measurements?

DR. ANSPAUGH (by Telephone): It was based on empirical measurements made not only at the Nevada Test Site but at many location following Chernobyl although at late times.

MR. ROLLINS (by Telephone): So your data should include some of what John's asking about.

DR. ANSPAUGH (by Telephone): Well, we have data that looks at mass loading and at the

same time Becquerels per cubic meter, yeah.

MR. ROLLINS (by Telephone): Well, maybe we could ask if you could share some of that with us or point us where we could go find it.

DR. ANSPAUGH (by Telephone): Okay, it's been, that data's been published, and I can certainly give you some pointers where to find it, sure.

MR. ROLLINS (by Telephone): Thank you.

MR. PRESLEY: Gene?

MR. ROLLINS (by Telephone): Yes, sir.

MR. PRESLEY: Bob Presley. Do you want to continue?

MR. ROLLINS (by Telephone): All right. Do you want to move on to the corrections for early fission and activation products?

MR. PRESLEY: Yes, sir.

MR. ROLLINS (by Telephone): This part was particularly intriguing to me and the results were interesting. What we did here we took the McArthur data which first of all we corrected it for the refractories. Dr. Anspaugh pointed out that we needed to do that, and so according to the formulas provided by Hicks, I put the refractories back

in. They'd been taken out. It would have been appropriate for the offsite to make the data applicable to onsite conditions.

What I wanted to do there was 177 radionuclides that were calculated as a function of time after detonation, I wanted to see how important each of those would have been to total dose. And to do that I set up a screening spreadsheet that allowed me to do that. And by using the ICRP '68 organ doses, I could determine the relative importance of each of those radionuclides as a function of time after detonation.

Now that in and of itself would not have been very helpful unless I had something I could compare it to, and since information was provided for strontium in the Hicks data, and because I've already calculated what the scale intakes of strontium would be -- those were done in the first five sections of the report -- then I could determine what the relative contributions of all the other 176 radionuclides would be as it compares to the dose delivered by Strontium-90.

If you go to Figure 6-1, the first

couple figures in this section, 6-1 and 6-2, 6-3 -- I have several datasets that were pretty close to one another back in the middle of 1962, and I wanted to determine which of those would likely be the most claimant favorable. And there's a discussion in there, I won't go into the details, but it appears that Small Boy, if we could use that data to normalize the doses to using the Small Boy data is going to give us the most claimant-favorable doses. And I looked at Little Feller One and Turk in comparison to Small Boy.

What we did here, the spreadsheet was developed, and it basically gave me fraction of the total dose provided by Strontium-90 as a function of time after detonation. Now something else that I needed to do because americium -- and these are, these dose factors, multiply the quantity given by Hicks times the dose diversion factor which in this case they have 50-year committed doses.

And so for many of these short-lived fission products, the one year annual dose is not remarkably than the 50-year committed

dose. But there are some exceptions, and one of them most notably is Americium-241. So one thing I had to do was go in and develop an annual dose for Americium-241 and use that in these calculations because using the 50-year committed skewed everything out.

I also did the same thing for strontium because we're using strontium to base everything else on so I wanted to get a good annual dose for strontium. And strontium does linger in some of the organs, and so for some of the organs a 50-year committed is remarkably different than the annual.

So I went in and corrected the dose conversion factors, the ICRP, and for those two radionuclides I actually used annual dose conversion factors. And those dose conversion factors are just for Becquerel. So we would take the relative quantity given by Hicks for each of the radionuclides, multiply it times its organ dose conversion factor. And then we would sum all those up and figure out from that how much of the total dose would be provided by Strontium-90.

And you can see how those factors

change if you go to Figure 6-4 through 6-10. And what I did in each case, and I could group some of these organs together because you can see the way the curves run. Some of them need to be singled out, but basically I wrote an expression for each of these curves and then integrated it from zero to ten years, and I could determine from that the correction factors that I would need to apply to account for all the other radionuclides.

DR. MAKHIJANI: Gene, just a question. The days after detonation is when the intake occurs? Is that, what does it represent?

MR. ROLLINS (by Telephone): This really does not have anything to do with intakes. What I'm trying to develop here is an adjustment to take into consideration all those other radionuclides that were providing dose to the various organs.

DR. MAKHIJANI: Thank you.

MR. ROLLINS (by Telephone): So this really has nothing to do with intakes. This is just, I'm trying to determine the relative importance of all those other fission and activation products.

DR. MAKHIJANI: Thank you, yes.

MR. ROLLINS (by Telephone): Ones that we have not accounted for.

MS. MUNN: And that really is a key issue, how important are they.

MR. ROLLINS (by Telephone): Right, and that's one of the things we've been grappling with for awhile here. And it all depends on what organ you're talking about. If you go to Table 6.1, you could see the relative importance. Now these factors that are given in the right-hand column over there, those are the factors that you would multiply the dose from strontium, the dose that a person received from strontium, to get the total dose. So to get the strontium dose, you go back to Section Five, Table 5.1, and you calculate the dose for the strontium intakes provided in Table 5.1. Then you would multiply, depending on which organ, by these values in Table 6.1 to account for all the other fission and activation products.

DR. MAKHIJANI: Now I'm confused. Won't this correction factor be a time-dependent correction factor? If you look at your chart,

there's the --

MR. ROLLINS (by Telephone): Yes, but I've integrated it over ten years.

DR. MAKHIJANI: Oh. What happens if somebody just worked for two years?

MR. ROLLINS (by Telephone): Well, then you give him two years and then you multiply it by these factors in Table 6.1.

DR. MAKHIJANI: Oh, no, I think your correction factor will vary depending on which two years you integrate it over. At least that's, I may be wrong, but that's just a quick comment. But just looking at that, looking at Figure 6-4, because your fraction of a total dose varies from very small to, you know, you've got fractions of one percent, and then you've got five percent. So those ratios could change by orders of magnitude depending on when you're actually doing the integration.

MR. ROLLINS (by Telephone): Okay, but at the same time you've got another, this where we come back to John Mauro's concern about the episodic nature. Because if you give a person ten years of intake and multiply it by this factor, say the factor's ten, are you giving

one year of intake and multiply it by a hundred, you get the same answer for the one year.

DR. MAKHIJANI: Well, that's just hypothetical because if you look at 300 days, and you figure 6.4, you've got something like .002. If you look at 3,000 days, you've got something like .03 or .04. And the ratio of that, you know, the answer is going to depend on when you do the integrations. So if somebody worked there for a couple of years, you could have a much lower or much higher correction factor for many of the workers.

MR. ROLLINS (by Telephone): Yeah, but you're going to have a much lower intake because he's only going to be there for two years.

DR. MAKHIJANI: Yes, but it's not a given that it would balance out. So this is kind of a revisiting that earlier that you do the integration, the correction factor uncertainties will cancel out. In this particular case I don't believe they would cancel out because if you're dealing with orders of --

MR. ROLLINS (by Telephone): Okay, in response to your concern we could easily chop this up into one-year increments.

DR. MAKHIJANI: Just a minute. If you're short-term intakes can overwhelm annual average intakes depending on the nature of the episode. So if you're dealing with three, four, five orders of magnitude, you could have a one-hour intake that's greater than an annual average intake under normal conditions. That's the whole problem with episodic intakes, and this seems to me to be a similar kind of problem.

MR. ROLLINS (by Telephone): It's exactly the same kind of problem. It's exactly the same kind of problem. But what we're trying to do, what I'm trying to do here is come up with a method that we can approach this in a reasonable fashion. Now we can easily chop this into one-year increments.

MS. MUNN: Would that resolve your --

DR. MAKHIJANI: I don't know. I mean, this was just a comment because I couldn't relate constant factors to the variable fraction so I'm not sure. I mean, it may. I'd just have

to study this a little bit.

MS. MUNN: Do you think if you were working, if you were dealing from the year where the empirical data was highest, then you should be able to reasonably bound the dose of an individual for that year. Is that not true?

DR. MAKHIJANI: Yeah, for that year. I guess we're discussing many different things at once, but this was just a comment on this particular piece as to how you do the integration. The earlier piece of using the 1972 value if it is representative of what people were actually breathing, then, of course, if we use that maximum, you'd be claimant favorable.

But in that case there's the problem of backward extrapolation into a period when there were no measurements and where the nature of the activities may have been different and the nature of the resuspension landscape would have been different.

So I think, you know, as John said in the beginning that we don't have a considered response to this. We just read it, and so we're just asking some questions as to how

this was done just to understand it. And my comment about this was simply that the variable nature of the fraction that doesn't correspond to the constant nature of the correction factor, that's all.

MS. MUNN: But an annual breakout would come closer to what you would anticipate being acceptable?

DR. MAKHIJANI: Well, as I said, obviously, an annual would be more accurate than doing a ten year integration, but I don't know, I haven't studied this to be able to give you a considered response as to what would work because it depends on going through the whole method.

And I think the main job of doing this is being done by John and Bob Barton and Lynn, and I'm kind of just a reviewer in this that I make this comment and that. So I think basically John is going to sign off on this and not me because from the beginning he's been doing this.

MR. ROLLINS (by Telephone): Keep in mind this time equal zero on this graph is really about July of 1962, and so your point is well

taken. The integration over the first ten years into 1972 may not be necessarily claimant favorable for somebody who only worked a couple of years in the middle ‘60s. But it’s going to overestimate for anybody after that.

MS. MUNN: Yes, we will make a large number of other individuals compensable.

MR. ROLLINS (by Telephone): Well, that’s why I decided it was time to run some numbers and see what kind of dose we’re talking about. If you go to Appendix A, I’ve done some of that. I don’t seem to have Appendix A in my copy. I’m going to have to remember that I guess, what I did there.

MS. MUNN: Don’t you have Table A?

MR. ROLLINS (by Telephone): I’ve got it around here somewhere. I’ve just got to locate it now.

Yeah, this is the dose from 30 years of intake shown in Table 5-1 with the correction for fission and activation products.

MR. PRESLEY: Are you talking about Table A-1, Gene?

MR. ROLLINS (by Telephone): No, yes, it'd be Table A-1. No, Table A-1 is not corrected for fission and activation products.

DR. MAKHIJANI: There is no other table in the appendix.

MS. MUNN: But you're saying there should be a table in Section Five?

MR. ROLFES: Gene, there was a table --

MS. MUNN: I only have scaled intakes, Table 5-1.

MR. ROLLINS (by Telephone): You don't have an appendix in your copy?

MS. MUNN: Yeah.

DR. NETON: We do. There's only one table.

MR. ROLLINS (by Telephone): And that's Table A-1?

DR. NETON: Yeah.

MR. PRESLEY: Goes through '63 to 2003 on the first page and then it's alpha, and then on the second page it picks up at '67 through electrons.

MR. ROLLINS (by Telephone): These are the doses, and these have been corrected for short-lived fission and activation products using those correction factors that we were

just discussing.

MS. MUNN: And they barely reach a millirem.

MR. ROLLINS (by Telephone): Correct, and I've only provided those organs that do reach a millirem.

MS. MUNN: Which indicates a lack of significance essentially.

MR. ELLIOTT: Inconsequential I think is his finding as he's proposed it, but we'd have to see the rest of it.

MR. ROLLINS (by Telephone): Well, except for possibly bone surfaces I would agree with you.

DR. MAKHIJANI: Now this is only, this is not correct. This doesn't include the multiplication.

MR. ROLLINS (by Telephone): No, this is corrected for fission and activation products and for early resuspension. All the correction factors are in this.

DR. MAKHIJANI: So the table that we were just looking at, 6.1 was it? Was Table 6.1 fission and activation product correction factors in there?

MR. ROLLINS (by Telephone): Yes, it has

been. It's in there. I thought this would be helpful for you to put it in perspective.

DR. NETON: Gene, it looks like all of the dose is due primarily to the alpha which would be the americium? Because the electron doses are very small.

MR. ROLLINS (by Telephone): Right, the americium and the plutonium.

MR. PRESLEY: Hey, Gene?

MR. ROLLINS (by Telephone): Yes, sir.

MR. PRESLEY: It's Bob Presley. We quit testing in '91, yet the bone surface data continues to climb through '95, drops off six and seven, and then starts dropping off to 2003. Can you explain to me why that climbed after we --

MR. ROLLINS (by Telephone): Because I postulated that we had 30 years of intake, so the years of intake would be 1963 through 1992.

MR. PRESLEY: Okay, thank you.

Anybody have anything else on this one?

DR. ANSPAUGH (by Telephone): I'd just like to mention that I think Gene is on the right

track here, but there are a couple of technical glitches, if you will.

MR. ROLLINS (by Telephone): Oh, and I forgot to mention, we haven't gone over the ingestion model yet, but that Table 7-1 also includes the ingestion of 100 milligrams of soil per day.

DR. MAURO (by Telephone): And you use the same basic approach in terms of prorating by radionuclide?

MR. ROLLINS (by Telephone): Correct, except this time I used --

DR. MAURO (by Telephone): Except that you're keying in on the --

MR. ROLLINS (by Telephone): -- ingestion dose factor.

DR. MAURO (by Telephone): So if we're okay with the inhalation, we should be okay with the ingestion. They're really the same thing.

MR. ROLLINS (by Telephone): Correct.

DR. ANSPAUGH (by Telephone): Let me --

MR. ROLLINS (by Telephone): And I will mention to you that the ingestion at 100 milligrams per day, the ingestion dose turns out to be limiting in many cases. I found

that an interesting result. And that 100 milligrams per day is twice what the EPA recommends, so there's another safety factor there.

MS. MUNN: So I have, I noted only one action item out of that. Bob, I know that Dr. Anspaugh's going to get data on number of Becquerels per square meter.

MR. ROLLINS (by Telephone): Actually, dust loading I think is what he's going to help us with.

MS. MUNN: Right, right, and then it was my understanding that you, Gene, were going to take a look at that and indicate somewhere in the final issuing of the ambient air intakes paper that you have here whether that reference in any way changes your conclusions that you've reached here.

MR. ROLLINS (by Telephone): To the best of my ability, but I could use some help, Bob.

MS. MUNN: Did I understand that action item correctly or not?

MR. PRESLEY: Well, I've got two things so far, dust in the air and we need them to go back and look at mass loading.

MS. MUNN: Well, I thought that's what the dust in the air was going to do for us.

MR. PRESLEY: Okay.

DR. ANSPAUGH (by Telephone): Mr. Presley, if I might, I'd like to just mention that a couple of key issues that I believe need some investigation or consideration. One is that the Nevada Test Site as you've all seen as a nice map has some definite boundaries, but the reality is these boundaries were pretty fuzzy and in 1963, for example, we had some major plutonium dispersal experiments that were just barely offsite. Those are not included in the McArthur and the papers because they were evaluated separately by the Nevada Ecology Group --

MR. PRESLEY: Can you speak up, please?

DR. ANSPAUGH (by Telephone): Three of these tests produced plutonium detected offsite, whatever that means. And I think that it's likely that plutonium was also detected onsite in 1963 from these plutonium dispersal experiments. And also, of course, they were NTS workers who participated in these experiments, and this kind of a source term is

not considered in this evaluation.

The other problem with the source term that at least needs some evaluation is that we have hundreds of the underground tests that vented. And these produced the traditional, largely short-lived source terms that have not been evaluated in this evaluation. And the most dramatic of these was Baneberry in 1970, and this was a particularly difficult situation because people had to be diverted to discard their clothing and take showers. In some cases vehicles were confiscated --

MR. ROLLINS (by Telephone): And did they participate in bioassay at that time?

MR. PRESLEY: Yes.

MR. ROLFES: Yes, they did.

MS. MUNN: Must have.

DR. ANSPAUGH (by Telephone): That remains to be seen. I don’t know that they did, and I don’t know that they didn’t, but I think we need some clarification on that.

MR. ROLFES: Dr. Anspaugh, NIOSH has done some bounding calculations with the bioassay data for the people that were involved in the Baneberry event. We’ve done some bounding

intakes of radioiodines for the people that were directly involved. And so that could be used to bound the environmental intakes for personnel that were not monitored.

DR. MAURO (by Telephone): Along these lines -- this is John Mauro -- in all of these, this almost goes back to the beginning going full circle, for your intakes that I believe are in Table 2-2, your annual intakes which, of course, are based on this picocuries per cubic meter dust loading that's in Table 2-1, are there any bioassay records at all for any of these time periods for plutonium in urine that can help to demonstrate that, yes, those intakes are, in fact, upper bounds?

You know, in the past it's always been very helpful, we know that air sampling has its problems in terms of being representative of what the person actually inhaled. And there's a premise that we're operating on here is that if you take the highest dust loading observed -- this happened to be in Area 9 in 1972 -- and assume that everyone gets that all the time, that was certainly on first inspection that absolutely looks reasonable.

But if there are bioassay data that go along with these measurements, that would enrich your argument greatly.

MR. ROLLINS (by Telephone): John, Gene Rollins, my experience doing dose reconstructions is that intakes of the magnitude shown in Table 2-2 could not have been detected.

DR. MAURO (by Telephone): Oh, I see. Okay, thank you. That answers my question.

MS. MUNN: And again, we're back to the, so how significant is it.

DR. MAURO (by Telephone): Let me ask you this then. Yes, so there are bioassay -- let me see, I'm stepping out of the box that I put myself in. There's all this air sampling data. There is a lot of bioassay data. But you're saying there really is no relationship between this model and the people you have bioassay for. In other words I may need a little help here.

So we have a number of people that have bioassays for a variety of reasons. And then we have these models, but there is no confluence of the two.

DR. NETON: John, I think what he's saying is even if we had bioassay samples for these people, the missed dose would be probably almost an order of magnitude higher than what the doses are that were calculated in this table.

DR. MAURO (by Telephone): So the bioassay data you do have, by and large, you're saying for plutonium for all intents and purposes shows nothing above any detectable levels.

MR. ROLLINS (by Telephone): Correct.

DR. MAURO (by Telephone): That's important to know. I didn't know that.

DR. NETON: But it still would be potentially an order of magnitude higher in its missed dose, so it wouldn't really be informative to say that these calculations were bounding. You know what I'm saying?

MS. MUNN: The missed dose is bounding.

DR. MAKHIJANI: Jim, that's the thing that we were discussing yesterday is, is there any way to benchmark this model with individual measurements?

DR. NETON: Probably not for plutonium anyway.

DR. MAKHIJANI: I mean, there is a variety of radionuclides here, and they did do bioassay for a number of radionuclides at the Nevada Test Site after ’67, right, as I understand it. So we were wondering whether it would really -- there’s a lot of constructs in this model, a really very large number, unusual number of constructs that are hung on measurements other than being back extrapolated, and --

MR. ROLLINS (by Telephone): Let me make an observation here based on my experience doing missed dose calculations, I’ve done over a thousand dose reconstructions now, the intakes shown in Table 5-1, those typically would not have been detectable either in vitro or in vivo bioassay.

DR. MAKHIJANI: Well, we understand that. I mean, there are, when you’re talking fraction or picocuries for, small fraction or picocuries per cubic meter, you wouldn’t get detectable amounts. We’re just wondering whether the final result, whether the model can be validated in some way because there are so many layers of assumptions that go into the

final result. We understand the final result shows a very low dose, but is there some thing that you can hang your hat on in terms of saying that this final result is reliable given the number of assumptions that have gone into it.

DR. NETON: I think one thing to point out is the conservatism built at every step along the way, and it tends to hopefully ensure that the model is bounding in that respect. And given that most of the dose from what I see in the final table comes from alpha intakes, those are the ones that you're really going to have to nail.

Some fission product measurements that show low values would not necessarily be informative because most of the dose, 90-plus percent of the dose is coming from plutonium and the americium. And as we know, the missed dose from those measurements is quite large.

So, I don't know, I think it would be interesting to hear additional perspectives on this, but I think it sounds like for our discussion here that there's a lot of conservatism built in here that maybe needed

to be pointed out more directly.

MR. ROLFES: The data that we can hang our hat on is the air monitoring data that we started with as the basis for this model. And all the hypothetical things that are subject to discussion are the correction factors that we have applied which result in higher doses essentially.

DR. MAKHIJANI: Yeah, we understand that, obviously, if you use the highest measurement from the highest area that that gives you a large amount of conservatism. But, you know, we've had extended discussions over years about indoor where we had an idea of where the air monitor is, and we had an idea of where the worker is.

And the uncertainties involved in even using indoor air monitoring data and the correction factors that need to be incorporated in terms of actual inhalation. And with outdoor air monitoring data not even from the period where we're actually applying it, if that is the base of the calculation model, I mean, I don't know how reliable can be said to be in light of the discussions

we've had.

DR. NETON: I think the key here is to go back to this dust loading comparison because I think I heard something very interesting from Lynn Anspaugh had talked about the long-term average dust loading, I think, is something around 50 micrograms per cubic meter.

DR. MAKHIJANI: Right.

DR. NETON: And if you remember the previous model John Mauro pointed out was allowing for 5 milligrams per cubic meter. And even under those conditions the doses were very low.

DR. MAKHIJANI: So why was that abandoned, and we've got back to the first model that's more refined rather than -- if we go back -- now I'm remembering that, you know, this was really the initial model proposed by NIOSH that we criticized in the site profile review. And I remember referring to Lynn Anspaugh's paper and saying the way, what the paper says is not the use that has been made of it by NIOSH. When you went to a mass loading model and now we've gone back to square one in a way that's more refined.

DR. NETON: Gene might be in the best

position to answer that.

MR. ROLLINS (by Telephone): Well, we really haven't gone back -- well, we really have gone back to square one because when I was trying to reconcile the intakes that my effort at a mass loading model with the uncertainty factors were resulting in, I couldn't reconcile those intakes with anything that had been measured out there from orders of magnitude and higher.

DR. MAURO (by Telephone): I'm not surprised.

MR. ROLLINS (by Telephone): But I wasn't comfortable going there because you could see these doses can get quite high for certain organs.

DR. NETON: Right, I (unintelligible) the bones surfaces ended up being the limiting organ --

MS. MUNN: It appears to be.

DR. NETON: -- in even the other model, but I don't recall how high they were. I've forgotten now.

MR. ROLLINS (by Telephone): Well, they would be probably a hundred times higher than

what you see in A-1.

MS. MUNN: But the question still is how significant is that?

DR. MAKHIJANI: So I'm a little bit puzzled. (Unintelligible) were a hundred times higher, I mean, it would be a dose that may make a difference in a few cases that would be worth calculating, but I don't understand how we went --

MR. ROLLINS (by Telephone): Every lung cancer and every respiratory cancer would probably be compensable.

DR. NETON: I'm not sure about that. The lung doses are very small. I mean, you're at five millirem.

MR. ROLLINS (by Telephone): Well, okay, I take that back.

DR. NETON: I think the bone surface doses were the ones in my recollection that were pretty high.

MR. ROLLINS (by Telephone): Yeah, you're right, bone surfaces and --

DR. NETON: Possibly liver in the later years because you could get up to -- well, you're into three rem range.

MS. MUNN: That's low.

DR. NETON: I think somewhere in between maybe it appears --

MR. ROLLINS (by Telephone): The red bone marrow would go up remarkably, and that means leukemia is --

DR. NETON: Yeah, leukemias.

MR. ROLLINS (by Telephone): -- would be compensable.

DR. NETON: I think it sounds to me that this look-see at the dust loading data that might be available could help bound this model. So almost sort of a hybrid of the first model and this one which is based on resuspension and look at the dust load and see if it makes sense.

DR. MAURO (by Telephone): This is John Mauro. I'm starting to get a full appreciation of what was done here, and it was quite an undertaking by the way, Gene. I have to commend you for the effort --

MR. ROLLINS (by Telephone): Thank you.

DR. MAURO (by Telephone): -- and the making use of the of the vase array of tools and approaches. And what I see here is the rock

that you're standing on is this .4131 Becquerels, Table 2-1 for Area 9. I guess it's the picocuries per cubic meter, 4.29 ten to the minus three Becquerels per cubic meter. That's the rock you're standing on.

And now what happens from there I think the links that occur from there on are all what I would say valid theoretical processes. That is, you go to the Hicks Tables to see the mix of radionuclides. You go back in time, and you correct for the changing resuspension factors. And I understand what you did there, and I certainly we're going to look to Lynn because that is in effect a 3.69 adjustment factor.

And each step starting from that rock you're standing on, the plutonium, everything builds from there. And from what I'm hearing all those steps you took from there seem to be within the range of a reasonable strategy that's scientifically valid in the literature in terms of the way in which you applied the Hicks Tables.

And then from there, once you know the Hicks Tables, you've got the ratio of

radionuclides, and then you have the adjustment factors that I guess keyed back to the Strontium-90. So that everything's really linked to this dust loading and then buying in on the Hicks models, buying in on and making proper use of Lynn Anspaugh's model to take into consideration this change in time and to take into consideration the changing mix of radionuclides as you go back in time and the change in the resuspension factor.

Now that being the case you ask yourself, okay, I think I see what we've got here. Is there anything that we can do to validate this. And I think one of the things we talked about is the dust loading. Is any information there that will give us a hook to say, yeah, and understanding where the air samples were taken.

In other words the rock you're standing on, that rock has got to be bulletproof. I mean, that's really what it comes down to. The 4.29 minus three needs to be bulletproof for the plutonium in the air at, again, location number nine in 1972. That is, we all have to be confident that, yes,

that, in fact, represents a reasonable upper bound on what the dust loading was where people were working were breathing.

And there was no situation where the dust loadings could be a prolonged exposure to significantly higher dust loadings could have at all be plausible. I mean, we have to make sure, if we can say that, we've really locked this up.

And then, of course, there's the step in terms of the applicability, the way in which you applied Lynn's model seems a little fuzzy right now, and certainly I can talk to Lynn about that and fully appreciate whether that 3.69 is the appropriate value because that used to be a real listing. In other words after you leave the picocuries per cubic meter plutonium, from there on everything else seems to be realistic.

That is, all the ratios are based on Hicks which is the real world numbers. There may have been this business of the refractories dropping out. Lynn had pointed out there may be a little error there that we may want to bring up.

MR. ROLLINS (by Telephone): I put them back in.

DR. MAURO (by Telephone): Yeah, you did, but I think you have to put more in.

Lynn, you explained to me very nicely yesterday why you felt a factor of two wasn't enough.

DR. ANSPAUGH (by Telephone): Well, what Gene did was multiply by a factor of two which would bring the refractories up to the level that they were even both onsite and offsite. But remember, Hicks dropped them out in order to calculate the refractories offsite. And so the question is where were they, the ones that dropped out. Well, they were onsite. So the correction factor should be more like a factor of three because you have 1.5 onsite and .5 offsite.

MR. ROLLINS (by Telephone): That's a good point, Dr. Anspaugh, and I can easily do that.

DR. ANSPAUGH (by Telephone): And one other point --

MR. ROLLINS (by Telephone): I think what you're going to see if you do that though, the doses are actually going to go down.

DR. ANSPAUGH (by Telephone): That could well be.

MR. ROLLINS (by Telephone): Because you're working backwards.

DR. ANSPAUGH (by Telephone): The other problem with strontium, by the way, you're absolutely right. Strontium is a refractory element, but it has two precursors that are not. One's krypton, and one is rubidium. And in Hicks, it allows for the fact that strontium itself was refractory, but its precursors were not. So that correction is a little bit more difficult than indicated.

MR. ROLLINS (by Telephone): Well, I would certainly be receptive to more defensible methods of putting those refractories back in. If you could provide that support, I'd be most grateful.

DR. ANSPAUGH (by Telephone): Okay, and also, I'd like to make a few more comments about the mass loading. I can send you some mass loading data which would more or less go with --

DR. WADE: Could you speak a little closer to the handset, please?

DR. ANSPAUGH (by Telephone): I can send you some mass loading data and those mass loading data represent ambient conditions at the test site which would go along with the ambient environmental radiation measurements, but neither is going to be representative of the guy driving a bulldozer across the field. So it's important to remember that the mass loading data is what it is, but it doesn't necessarily represent what the person would have experienced in doing soil disturbance.

MR. ROLLINS (by Telephone): Again, if it's true what I was led to believe and what the environmental reports say that these air sample results are where the people are driving bulldozers.

DR. MAURO (by Telephone): Yeah, I think it's important that we look, that needs to be really nailed down. Because if the air samples were taken right there in the heart of where the action was, you know, where the people were digging and working at the time they were doing it, well, you certainly have a real strong argument.

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

the point that they made. I've talked to the people that were involved in those measurements out there, and that was the whole point of doing it. It doesn't make any sense to pull an air sample that's not representative of what anybody's exposed to.

MS. MUNN: Well, any Health Physicist I've ever known in my life would want to be taking the measurements where the activity was occurring. They wouldn't take them somewhere else.

DR. NETON: I think one of the things we need to look at though is if there were continuous, 24-hour-type samples. You have sort of a dilution effect going on where the activity would increase the airborne, but then while the sample's being collected over the next 20 hours, it's collecting somewhat cleaner air. So we need to look at that pretty carefully.

DR. ANSPAUGH (by Telephone): I do not believe that these samples were taken for radiation protection purposes, but it's important to know exactly why they were taken.

DR. NETON: Exactly.

MR. CLAWSON: This is Brad talking again. Something else we need to look at is the very time when these samples started to be taken. As Mr. Presley put it, everything was being watered down, but then they were coming out the next day, and from what I understood from these people, there was contamination there.

The one big factor in that is wind, and that was moving tons and tons of soil, topsoil, everything else, and this is what initially started putting them into a lot of these air samples. This air data that came out of that was trying to track what was blowing and what was going on. A lot of it wasn't for protection of the individuals.

DR. MAKHIJANI: Could I raise a minor question? On page two, the annual breathing rate implying that only about 1.04 cubic meters per hour. That's less than what we normally assume of 1.2, and I wondered why that was done.

MR. ROLLINS (by Telephone): I can't address that. I've just been, the project as a whole moves 2,600 cubic meters per year. That's a value that we've been using in all these TBDs

to my knowledge, and I didn't calculate that. I was handed that.

DR. MAKHIJANI: Jim?

DR. NETON: For onsite environmental, which is a little different than onsite, this is sort of like onsite occupational if you want to look at it that way. The environmental one is essentially people walking around the site with light activity.

DR. MAKHIJANI: Right.

DR. NETON: But I can see a case could be made in this particular situation that these are really onsite light workers.

DR. MAKHIJANI: Yeah, we use 1.2 for light activity normally.

DR. NETON: Yeah, but that's for a worker who was actually physically in a plant doing a job for light activity. Whereas, someone, normally your environmental measurements are people who onsite working but just in the general environs of the plant, maybe administrative personnel and people walking about, that sort of thing.

DR. MAKHIJANI: Yeah, it just didn't match with what I understand that NIOSH normally

does, but --

DR. NETON: We'll need to take a look at that.

DR. MAKHIJANI: It's just a minor point.

DR. MAURO (by Telephone): This is John again. There was, awhile back we talked about something that had to do with, it was some clean up activity at the site prior to the time periods when your air sampling data are here. Is there any reason to believe that the concentrations of radionuclides in the air might have been much higher some time between '63 and '71 because of the clean up that may have taken place at some of these locations, you know, prior to 1971?

So therefore, we might be underestimating the exposures. You see, everything's linked to this 1972 number, and if it turns out that that reflects some degree of clean up that had taken place prior to that date, then also the rock doesn't look so good. Is Area 9 one of the areas that were cleaned up?

MR. ROLLINS (by Telephone): Dr. Anspaugh could probably answer that better than I

could.

DR. ANSPAUGH (by Telephone): I really don't know the answer to that, but the question is answerable by going back to the people in Environmental Management at Nevada Operations, I believe.

MR. PRESLEY: That ought to be something that would come to light. My -- this is Bob Presley. My recollection, you know, when we got through with something out there, unfortunately, we moved off and left it. And I don't know how much clean up was done in the early days. The clean up that I would be involved with was after '91.

Why don't we take a break for about ten, 15 minutes, come back at 15 after 11.

DR. WADE: We're going to mute the phone now.

Now I have given out to Board members and selected others a copy of the TBD on occupation external dose, so now work group members have that.

MR. ELLIOTT: And that's on our website, and it's not a draft.

DR. WADE: Does anyone need a copy of the,

hard copy of the ambient air intakes, the document we were just discussing?

So we'll take our break.

(Whereupon, the working group took a break from 11:00 a.m. until 11:23 a.m.)

DR. WADE: This is the work group with Lew Wade. We're going to start up again. I'd like to make a couple of sort of observations before we begin based upon the talk in the hall here, and I had a very productive discussion with Brad Clawson.

But before we begin, Dr. Anspaugh, your comments are most important to us, and we'd like for you to do what you can to project a bit louder in the room here. So I don't know what that means, if you're speaking into a handset or if you're using a speaker phone, but if you could give some thought to how we could hear you more clearly. People are hanging on your words, and they're not getting every word you deliver, okay?

DR. ANSPAUGH (by Telephone): Okay, I'll do my best.

DR. WADE: That's pretty good. Shouting is acceptable. But thank you.

So let's just take a pause as to where we are. I know that there can be great frustration in meetings like this for a variety of reasons, and let me talk about two or three things.

The process is always changing. NIOSH puts out a document, a work group reviews it, asks SC&A for comments, SC&A makes comments, the work group endorses those comments, NIOSH sets off to change the document, and a new document exists. And the timing of that relative to work group meetings, in spite of all of our best efforts, it's hard to control precisely.

So I think there are two very important things that can happen at this meeting, and I think they're both happening to a degree. As Jim mentioned, I think it's important that the work group goes through the matrix and, where possible, closes issues or issues very specific instructions as to the next step. And I think there's a lot of that in this matrix that lends itself to that.

We have these two big things that have appeared as a result of good scientific

process of the work group, and I think it's important that the work group understands what's contained in them, not debate them to closure, and decides if it wants its contractor to look at them. And if you want your contractor to look at them, then it's important that your contractor is able to ask clarifying questions while everybody is together so that they can go back and do a meaningful review. Otherwise, we'll come to the next meeting, those clarifying questions will be asked, and we'll be a step further behind.

So that's what's going on here. Two big documents have recently appeared. No one's a bad person because of that. The question is the work group needs to understand it. Your contractor needs to understand it if they're going to be asked to review them, and that's time well spent here. And trying to go to closure for those things in the matrix that are a bit more mature and don't have these big items looming I think is also appropriate.

So the ultimate Pollyanna I am, and that is this is good. We're doing the right

kinds of things. I appreciate the frustration, and you know, it would be nice if this was perfect, but it's not going to be perfect because we're doing this in real time and things are evolving. And that's the nature of the process we're in, and I think that's okay.

So Robert, comment or critique to that? Anybody else?

MR. PRESLEY: The only comment that I have is the same one that Jim and Wanda and Brad probably had, too, is they would like to see us go through this matrix and say what's complete and what's not complete on it and put that aside. And then come back with some action items for SC&A and CDC or NIOSH, and let's move on with what needs to be done rather than hash this out over and over and over and over again.

MR. ELLIOTT: If I could add an observation. What I also think is in the balance here on the issue that we just talked about, a component of dose which is actually a very minor component of dose. If you look at the broad spectrum of dose, it gets reconstructed

for these claims. And in that I think you have to ask yourselves how much time, effort and resources are we going to expend on researching, analyzing and discussing, debating and attempting to resolve a very minor component of dose that may only affect a limited, very limited, maybe a handful of claims that are best estimate cases?

And so we have to take this into consideration in the program with our resources that we have. How far do we pursue something? And so I'd just ask you to think about that in the balance of deliberations.

MR. PRESLEY: You know, if what we're deliberating about is going to help the total program, or if it's maybe one-tenth of one percent, then is it worth going in and really deliberating this for one-tenth of one percent of outcome?

MR. ELLIOTT: I don't want to see one claimant not get --

MR. PRESLEY: No, I don't either.

MR. ELLIOTT: -- compensated if this is the dose that prevents them from that. But at the same time, we have to make hard decisions in

the program about how much effort to extend on a given issue.

MR. PRESLEY: Thank you, Larry.

Lynn?

DR. ANSPAUGH (by Telephone): Yes.

MR. PRESLEY: Do you want to continue going through your document?

DR. ANSPAUGH (by Telephone): I'm not quite sure what you mean by my document.

MR. PRESLEY: I'm sorry, not Lynn. Gene, Gene Rollins. I'm sorry.

DR. WADE: Well, I think we've done this. You've had your discussion on this document I think.

MR. PRESLEY: Are we complete? Everybody satisfied?

DR. ROESSLER: I think it would be helpful if Gene were to make a concluding remark about the significance of the numbers that are being generated.

MR. PRESLEY: Did you hear that, Gene?

MR. ROLLINS (by Telephone): Yes. We didn't go through the ingestion, but that's pretty straightforward. I basically used the, developed the intakes of Becquerels per year

ingestion based on the most contaminated area at NTS to assure that we're not underestimating potential ingestion dose. Then I applied the same type of correction factors that I did for the inhalation intakes.

And what was interesting to me was that by assuming 100 milligrams per day, in many cases those ingestion doses came up higher than the inhalation doses. But in Table A-1 you see the combination of both ingestion and inhalation with all the correction factors applied. And I did that to help everyone gain perspective as to the magnitude of the doses we are talking about.

Having said that I guess that concludes my remarks.

DR. MAURO (by Telephone): Gene, this is John Mauro. Before we broke, I raised one question that was sort of left on the table, and that is to explore a little bit this idea of whether or not there was some clean up. And I guess that's one area that I think -- remember, my main concern is that that one number, the 1972, Area 9, that we're standing on seems to be really important and very good,

very good strategy. We have to make sure that it's solid.

And one thing that, one issue that I'm concerned with is that this clean up question does not somehow undermine the validity of that number. And we really did not explore that or discuss whether or not there's anything that needs to be done to make sure that the clean-up issues that may have occurred between '63 and '71 somehow doesn't undermine that number.

MR. ROLLINS (by Telephone): I hear what you're saying, John.

MR. ELLIOTT: Gene, this is Larry Elliott. Let me answer this. I guess is it a matter of determining if and when the clean up activity occurred? Is that what you're after, John Mauro?

DR. MAURO (by Telephone): Maybe it's even simpler. I just want to make sure that the fact that there may have been some clean up at some of the locations does not undermine the fact that that number that was selected as the rock we're standing on may not be the reasonable upper bound.

In other words, there may have been some -- for example, let's say Area 9 had some clean up in the late 1960s. I'm making this up now. And therefore, the numbers of the 1960s for air dust loadings may have been much higher than the number that we're looking at in Table 9. I know that this question has come up before, and that there was some clean up. And it would be nice to put that to bed.

MR. ELLIOTT: Well, let us take that as a constructive comment. We'll consider it as we move forward with trying to finalize this particular document, and we'll let you know. We'll let the working group know what NIOSH's reaction is, and how we attempt to address this. We'll take it as a constructive comment, and we'll work from there, and get back to you. I'm not ready to commit today that we're going to go try to pursue this to the nth degree. But I want to talk with staff and with Gene about how they feel about this and how solid that number is.

MS. MUNN: And with respect to the data on when and where the air samples were taken, do we already have that?

MR. ELLIOTT: I think we need to look into that. I think we need to look into the strategy used to employ collecting air samples. And that needs to be developed, I think, over time, not just looking at a specific year and saying that's the way it was done. And I do believe, Brad pointed out very appropriately that in many instances they were looking at what left the site, not so much as what people were working in on the site.

So let's just look at that. And I think we also need to come back with a better understanding about the mass loading effect here. But at the end of the day I still say that, you know, we need to consider this as the component of dose that it is. It's not a huge contributor here. And so in that balance we'll figure out what we're going to do here, and we'll report back to you.

MS. MUNN: Thank you.

DR. WADE: Now it would be the pleasure of the work group to go to the matrix and start going through it. You have one other document that is new to you. So it's up to you, Mr. Chairman, how you want to proceed.

MR. PRESLEY: Do you want to take the time to go through this now or do you want to go to step through the matrix?

MS. MUNN: Maybe the matrix is something we're more familiar with, but I haven't had a chance to look at this.

MR. PRESLEY: Why don't we do that?

DR. ROESSLER: And then if somebody identifies something that will relate to this document, then we can do that next.

DR. NETON: I think a number of the matrix items indicate that the TBD will be modified. And where that modification has been maybe it can be pointed out.

MATRIX DISCUSSION

MR. PRESLEY: I'm just going to start then with comment one. I have that marked from earlier meetings that comment one was complete and that we were going to put the business about the radionuclides to bed.

MR. ROLFES: Yeah, that's correct. We have incorporated those additional radionuclides into the TBD, and let's see, this is chapter five. We have a drafted version of chapter five that has been sent informally to NIOSH

for review, I believe.

Gene?

MR. ROLLINS (by Telephone): Excuse me?

MR. ROLFES: Gene, this is Mark.

MR. ROLLINS (by Telephone): Okay, Mark.

MR. ROLFES: We have incorporated the radionuclide list into the drafted version of chapter five, correct?

MR. ROLLINS (by Telephone): Correct.

MR. ROLFES: And that will undergo internal review, and if we have any comments on that, we will provide those to ORAU and the work group. And that should be published shortly after.

DR. WADE: And the work group will see that, and so the work group can't close this issue until it sees that.

MR. PRESLEY: Work group will review for completeness. Is that still in the --

MS. MUNN: Will review chapter five essentially, right?

DR. WADE: And this is the internal?

MR. ROLLINS (by Telephone): That chapter has not been signed off to my knowledge.

MR. ROLFES: Correct, it hasn't been

approved by OCAS yes, but I believe Cheryl had provided an informal draft to us.

DR. WADE: So NIOSH is saying basically it heard the message of the work group, and it has acted consistent with that. It believes it will provide the work group with evidence of that once it's publicly available.

MR. PRESLEY: Comment two --

MR. ELLIOTT: Just for clarity here, I hate us to commit to a timeframe, but I think it's that question hanging there. I'll ask it if nobody else is going to ask it. How soon do we expect to see comment resolution done on this and it'll be a final?

MR. ROLFES: I believe the document was going to be provided to Document Control sometime this week as well, and so it should be approximately two weeks is the normal turnaround time for these.

MR. ELLIOTT: So what we're talking about here in government-speak, folks, is an informal document draft was sent to us so that we'd have courtesy advance view of it so that we might be able to speak to it in some degree here.

A final draft will come forward and get put into our comment resolution process, and that's two weeks to achieve addressing those comments, receiving those comments, and then another two weeks to address the comments. So it's probably two months down the road.

MR. ROLFES: I'd say that's an upper bounds. It should hopefully be sooner than that.

MR. PRESLEY: We can say first of October?

MR. ELLIOTT: We'll strive for that.

MS. MUNN: Hopefully, we will be able to see it and say something about it at our October meeting.

MR. PRESLEY: That's what I wanted to do. Let's see, the October meeting is, some of us are going to be out there on the second.

MS. MUNN: Yeah, some of us will be there afterwards, too.

MR. PRESLEY: But you know, if you could strive to get it to us a day or two before the meeting, at least where we've got something.

MR. ELLIOTT: That provides you discomfort, Mark? Gene, do you feel a chain being pulled? Gene?

MR. ROLLINS (by Telephone): My understanding is one of the things that was holding this up was the resolution of this white paper that we've just finished talking about. Because there are some internal dose implications in this that are touched on in chapter five. And so she was waiting for the outcome of our discussions to put the finishing touches on that.

MR. PRESLEY: Do we have enough information for you to put the finishing touches on it now? Or do SC&A and NIOSH need to go back and do some discussions and come to some kind of agreement on some of these issues?

MR. ELLIOTT: Again, I think we're back to what I said earlier. We had very good discussion here today about, we've heard some good constructive comments and input. We need to react to those, address those and tell you how we've done that. I think we should be able to come to you with a finalized document.

DR. WADE: Again, just being the keeper of the keys here, if this works according to plan, then the work group is likely to get this document the week before the October

meeting. And again, you're going to be under, it'll be the same discussion. If we just got this, you're going to have to anticipate that and decide on how you want to hold your discussion. But NIOSH is looking to try to get you something before the October meeting, but I don't hear them getting it to you months before the October meeting.

DR. ROESSLER: Does that imply that we might have a work group meeting associated with the next Board meeting?

DR. WADE: I took that from the Chair's comments, but I --

MR. PRESLEY: Now, we have a, that's something we're going to have to discuss because right now the Procedures Work Group has a meeting before. The Procedures Working Group has a meeting on the second all day long. And that's already tying that up. Where we can get back together in the next two months, whether we're going to have enough information to get back together sometime in the next two months probably will come out of this meeting today.

DR. WADE: Let's even take a moment and look

at the sort of big perspective here. What's going on in the world that you live in is that an SEC petition for the Nevada Test Site underground test phase is working its way to you. When will that petition likely be presented to the Board?

MR. ELLIOTT: At the October meeting, I believe, is what we're targeting.

DR. WADE: So at the October meeting the Board will see the underground test phase of Nevada Test Site petition in front of it. At that point the Board is likely to take up a review of that petition evaluation report. It's possible these materials will be germane to that, so you're going to have to start to coordinate. Now, it doesn't seem that the timeframe is unreasonable, but this work group's reports will be quite influential to the Board's deliberations of the SEC petition.

MS. MUNN: It's also a concern to me that we're developing action items on some of the material that's necessary to be incorporated into chapter five before we can move forward, and it muddies the water.

DR. WADE: I think sometimes, and maybe this

is one of them, we just have to say let NIOSH present its chapter five based upon what it's heard here today in a review able form to the work group. Otherwise, I think we're just getting more and more delay built upon delay. So if Larry's comfortable saying we've heard the discussion as it relates to Gene's document. We will complete our chapter five and share it with you. I think that's the way to go.

MR. PRESLEY: I have no problem with that whatsoever.

MS. MUNN: Good.

DR. WADE: That's one.

MR. PRESLEY: Next one, comment two, TBD does not provide adequate guidance, for dose estimates to the gonads, skin and gastrointernal (sic) tracts for early reactor test and re-entry personnel. We talked about hot-particle doses to the skin. I have that also marked complete. You all were going to address that in another document as I understand it.

MR. ROLFES: Correct. There's certain areas of the Site such as the Nuclear Rocket

Development Station where this is a possibility, so we're aware of that. And when we have factual information for a claim, we would adequately, we would assign that dose to that claimant. And we have a path forward for doing that based on information that was suggested to us by SC&A, the NRDL report.

The other issue is the science issue of addressing hot-particle exposures, and Jim?

DR. NETON: Yeah, that's more of a generic issue. I think as Mark says there's two phases here. One is do we, is it appropriate that we address these hot particles at the nuclear test stations. And I think we agree with that. How they're calculated is guidance that needs to be added into the external dose implementation guide, and specifically, that will address using VARSKIN to calculate dose to small areas of skin. I think I addressed this at a meeting several meetings ago where I talked about using the VARSKIN model to do the doses to one square centimeter of skin if that's appropriate.

And secondly, the ingestion hot-particle issue, we had researched that and

determined that not to be, we would not do our dose calculations any differently for ingestion of a hot particle versus ingestion of any other sized particle. There's just no support for it scientifically at this time that we can find.

DR. MAKHIJANI: Was there a debate with Joyce around that if I remember?

DR. NETON: I don't recall that specifically.

DR. MAKHIJANI: It's been awhile.

DR. NETON: It's been awhile that we discussed this, and I don't recall, I think Joyce may have suggested that the new GI tract model that's coming out might have some relevance here, but I think my position at that time was it was not available as a standard model so we wouldn't use it until it was official.

DR. MAKHIJANI: I recall some kind of discussion, but I'm not sure what --

DR. NETON: But those were sort of separate and apart from this issue here because the NRDL report does have some very good data in there about particle sizes and doses as a

result of the fires and reactors.

MS. MUNN: So my only question is -- I agree with your assessment. Have words been added to chapter five and six to indicate that that has been taken into consideration and that this is the conclusion? That's my only question about the action item. Is it incorporated yet?

MR. ROLFES: Gene, do you know if this wording was incorporated in the draft? I haven't had the opportunity to review the draft at this time. Gene, do you know if chapter five contains information on the fact that we will not be changing our internal dose calculation methodology?

MR. ROLLINS (by Telephone): I was told that it was. I'm almost certain. I'm trying to find it right now as I'm going through this thing, but it's --

MR. ELLIOTT: That'll be one thing for us to check.

DR. NETON: This is not a draft document by the way. This one is a released, signed document. But there are separate sections in here that address the nuclear reactor

personnel. I don't recall the exact wording that went into it, but it addresses several issues. One is planer contamination, and one is worker contamination. Well, we'll have to go through it.

DR. MAKHIJANI: Yes, the volume six does -- I agree, it's as I said. I read parts of it quickly, but it does have new material on this particular question. So to some extent, at least, is responsive to the comment that was made. What's in there we don't have an assessment.

DR. NETON: And it's true, the working group will review that section for adequacy.

DR. MAURO (by Telephone): I'm looking at chapter six right now, and I notice on page 36 they talk about the nuclear and ramjet engine tests and the different exposure scenarios. And I'm looking for anything related to -- I see beta particle. So, I mean, certainly that is addressed to some degree in that chapter, the new chapter.

MR. PRESLEY: What I've got down for our action item that the working group will review for completeness, but NIOSH will verify that

the information has been added to the TBD. Is that correct?

(affirmative responses)

MR. PRESLEY: Comment three, doses from large, non-respirable particles to the GI tract and skin for workers in the early atmospheric test periods have not been evaluated. And that one I also have marked complete with the fact that the working group needs to go back and look at chapter five and six.

MR. ROLFES: This is essentially the same issue as number two, and I think we discussed both of those. And I believe it’s the same response that we’ll just verify that we do, in fact, have the statements to address these findings within our approved technical basis document.

DR. NETON: One thing that I think I would like to bring up here though is that it’s sort of implied here that outside of the nuclear reactor test areas there are the existence of these large hot particles sort of potentially throughout the site. We’re not necessarily aware of that condition existing at Nevada

Test Site.

If SC&A or others could provide evidence or documentation if that's the case, we'd certainly be interested in looking at it. But at this point it's sort of one of those prove a negative issues. Where were these other particles that could have potentially added hot-particle doses? Right now I don't know that we've uncovered any existence of any sort of particles.

That being said, however, the same principles do apply. If we become aware through a CATI interview or some other means that there were these isolated pockets, we would certainly address them just as we would do for the nuclear reactor test personnel.

MR. CLAWSON: I need just a little bit of clarification. This is Brad. On this nuclear test, you're going to be covering all the different tests that went on, but you're also going to be covering the ROVER explosion?

MR. ROLFES: I'm sorry, did you say the ROVER?

MR. CLAWSON: ROVER, when they took care of the reactor.

MR. ROLFES: Sure, ROVER would have been part of the nuclear rocket development station.

MR. CLAWSON: So it's covered in that?

MR. ROLFES: Yes.

MR. CLAWSON: It's not going to be covered as an incident or anything like that.

MR. ROLFES: Exactly, that would be one of the primary areas where the concern about how critical exposures would be involved. The ROVER test at Area 25 at NRDS, I believe that that was one of the things that was documented in the NRDL report. And so NIOSH is aware of that, and basically, we are going to be considering hot-particle exposures primarily for that location.

We don't have any information to indicate that there were hot-particle exposures in other parts of the site at this time. However, if we do have new information that comes available, then at that time we could address those exposures.

MR. PRESLEY: Something might come out of say where we had a tunnel shot then, or something like that, we might have a hot

particle. Somebody might bring that up in an interview or something like that. That's the only place I could see where you might have one.

DR. MAKHIJANI: Or some, when the people went through the Baneberry cloud by accident, it could have had hot particles. So there's certainly --

DR. NETON: Some scenarios --

DR. MAKHIJANI: -- scenarios that you know are plausible for the events that happened there that could result in hot-particle exposure. I haven't come across a document that says here's a person with --

DR. NETON: Exactly.

DR. MAKHIJANI: Maybe Lynn has something, some light to shed on this.

MS. MUNN: Doesn't sound like it.

MR. ROLFES: The large hot-particle issue as Jim mentioned is not going to be a considerable internal dose issue for us. However, for external dose it could be significant for the skin, and still that's going to have a very limited scope because it's not going to significantly affect doses

to other organs besides the skin. So, at least I'm not aware of any significance for other organs.

DR. MAKHIJANI: It's important for a common cancer.

MR. ROLFES: Important for a skin cancer possibly.

DR. MAKHIJANI: Very common cancer.

MS. MUNN: I think you just answered comment four.

MR. PRESLEY: Yes.

MS. MUNN: So it should be in there, word should be there.

DR. MAKHIJANI: Comment four was oronasal breathing.

DR. NETON: Well, I think this is sort of a confusing comment to me because it talks about oronasal breathing, but then it talks about actually hot particles and ingestion due to the impaction of a particle and then swallowing it. But outside of the nuclear reactor test personnel, which we agree we're going to cover using the NRDL -- I don't want to say methodology, but approaches or data, it's not clear to us that there are other hot

particles that are going to contribute significantly to the dose. We've just gone through Gene's bounding attempt here at internal doses from resuspension, and they're very small. So whether that particle is large or small, it's a small dose.

DR. MAKHIJANI: This has nothing to do with resuspension. This would be an initial, initial deposition.

DR. NETON: Right. Again, a similar argument, it certainly applies to the nuclear test personnel, but the general workers at the site outside of a few isolated pockets would not be affected by this to our knowledge.

MR. PRESLEY: Four, I've got, it's noted in here that this is would come out in a complex-wide guidance.

DR. NETON: Well, again, this is a slightly different issue though. Oronasal breathing has to do with apportionment of a general dose from a person breathing through their mouth versus breathing through their nose and supplementing with their mouth. That's a generic issue that we're addressing, and that issue has been resolved, addressed by us in

draft form at least. I'll more than likely be presenting that at the next Advisory Board meeting on that issue. But that really is not, oronasal breathing happened to be in the sentence here or this comment. But it's really sort of an ancillary --

DR. MAKHIJANI: You're right, you know. I wrote those words, and I think I didn't use the felicitous phrase that what was meant here, because we're dealing actually with non-respirable particles. And so I think I should, looking back on it I should have used different words. It's really swallowing of non-respirable products --

DR. NETON: That's exactly it.

DR. MAKHIJANI: -- is what it should say. And so let me make a correction to the original words.

MS. MUNN: Let's use your felicitous language.

DR. MAKHIJANI: Swallowing of non-respirable particles. I put in the correct.

DR. NETON: Then I think we remove the fact that this is addressed on a project because it's really not. It's a unique issue related

to the swallowing of non-, large non-respirable products.

DR. MAKHIJANI: That's what I meant.

DR. NETON: And we agree that we will deal with that as part of the NRDL report language.

DR. MAKHIJANI: Sorry about that.

MR. ELLIOTT: Thank you for that clarification.

DR. MAKHIJANI: Yeah, I know. It suddenly struck me just listening to Jim that it's not used the right words.

MR. PRESLEY: But still we want to have a presentation on that at the next meeting.

DR. NETON: Well, oronasal breathing, but it really is not necessarily related to this comment.

DR. MAKHIJANI: So this will be in your volume five of the internal, this will be addressed in the volume five revision of the internal dose. But this is a site-specific issue.

DR. NETON: Yes, this is a site-specific issue at this point.

MR. ROLFES: Ingestion of particles will be addressed in chapter five.

MR. PRESLEY: Comment five, resuspension.

DR. NETON: This is all related to Gene's --

MS. MUNN: Resuspension model, mass loading approach. This is all what we've just been talking about this morning.

MR. PRESLEY: My comment on that is we're going to address it today.

MS. MUNN: We have three action items to close it, right?

MR. PRESLEY: Let's see. I have two action items, mass loading and dust sampling. That's all going to be rolled into one. Larry's going to look into the problem and get back to us on clean up of Area 9.

MS. MUNN: And where and when the air samples were taken.

DR. ROESSLER: Why.

DR. WADE: And why.

MS. MUNN: Where, when, what.

DR. NETON: I'll assign that to NIOSH staff and not Larry.

MR. PRESLEY: Why don't I put down NIOSH?

MS. MUNN: As we requested, NIOSH.

MR. PRESLEY: And then when and where the air samples were taken?

DR. ROESSLER: Why.

MR. PRESLEY: Where, when and why.

DR. ROESSLER: I think we know when, but verify it.

MR. PRESLEY: Air samples were taken. Looks like three action items.

MR. CLAWSON: What were they again? I want to get them.

MS. MUNN: No, it was all, Dr. Anspaugh was going to get the data on dust loading.

MR. PRESLEY: He's supposed to get back with Mark on the data.

MS. MUNN: Back to Mark and Rollins. And Rollins will include his conclusions in the reference to the final ambient intake.

MR. CLAWSON: Review this document after they've got that all down?

MR. PRESLEY: We need to.

MS. MUNN: They'll let us know when it's there, and then we have to ask NIOSH.

DR. WADE: Then the document will be ready for review.

MR. PRESLEY: I put down that working group will review for completeness. How's that?

MS. MUNN: Uh-huh.

MR. PRESLEY: Okay, comment six, the use of site average air concentration values where worker location is not known, and there was a comment there about claimant favorability. And I also marked that complete.

MR. ROLFES: This is also no longer really an issue because we're using the highest documented air concentration.

DR. MAKHIJANI: This, yeah, this relates to the same paper.

MR. ROLFES: Exactly.

MR. PRESLEY: Okay, comment seven, again, resuspension dose to monitored workers, especially in the early years. I've got that marked complete with a question mark. We have added neptunium. I have a note on here that we want to add a couple of radionuclides.

MR. ROLFES: Correct. NIOSH has incorporated those two additional radionuclides into the draft of chapter five, and that will be a revised, the revision will be approved shortly, I believe. We also did make a note in there that Sodium-24 was potentially important to internal dose during the re-entry the first two weeks after an

event.

MR. PRESLEY: Is this going to be done under chapter four or chapter five?

MS. MUNN: Chapter five.

MR. ROLFES: This will be chapter five.

Gene?

MR. ROLLINS (by Telephone): We've specifically talking about the potential contributions from Sodium-24 and Neptunium-239?

MR. ROLFES: Correct.

MS. MUNN: Yes.

MR. ROLLINS (by Telephone): When I ran the calculations in section six of my paper, what they indicated was that in the first maybe several weeks after detonation Sodium-24 did play a relatively important role. As I recall, it may have been in the 15 to 20 percent of the total dose, but its importance diminished pretty quickly. But Neptune-239 did not contribute anything significant to the dose.

DR. MAKHIJANI: Just so I'm understanding, the comment was about re-entry workers in the tunnels. This is no longer an outdoor

environment, you know, resuspension. We're talking about resuspension in an inside tunnel environment. We're not talking about what's covered in the white paper that we've been talking about this morning. This is a different issue.

MR. CLAWSON: This was the tunnel workers.

DR. MAKHIJANI: Yes.

MR. ROLLINS (by Telephone): My information that I have learned about the tunnels at NTS, I've never been in a tunnel at NTS. I have been in tunnels at Yucca Mountain. And my experience is unless there's a great deal of ventilation involved, those are wet environments. Water actually drips onto you from the top of the tunnel.

MR. ELLIOTT: No.

MR. CLAWSON: No, it's very, very dry.

MR. PRESLEY: Yeah, super dry.

MR. ROLLINS (by Telephone): Well, at NTS it's not. The alcoves at NTS are dripping water.

DR. MAKHIJANI: You mean Yucca Mountain.

MS. MUNN: You mean Yucca Mountain.

MR. ROLLINS (by Telephone): Yucca Mountain,

correct.

MS. MUNN: Yeah, that's true, but at NTS it certainly looks different now. It looks very dry, and I've been both places, too, Gene. Yeah, they're very different.

DR. ANSPAUGH (by Telephone): When the tunnels were operating at NTS, they went to a great deal of effort to get the water out of there. In fact, the tunnels themselves were quite dry.

MR. PRESLEY: That's correct.

DR. ANSPAUGH (by Telephone): They tended to get quite contaminated because some shots vented and contaminated the tunnel while they were trying to drill a new drift for the next test.

MR. CLAWSON: This is Brad. This is also when they came into the ponds that were outside of the tunnels, and the contamination was coming from that.

DR. NETON: It seems to me that if anyone that was monitored for bioassay samples, were the tunnel workers. Is that not right?

MS. MUNN: I would think so.

DR. NETON: I knew we had plenty of tritium

data on tunnel workers, lots of it.

MR. ROLFES: The great majority of the data that we do have were tunnel workers.

DR. NETON: So I think this is a case where we could do some evaluation using bioassay data to help establish bounds, verify, validate, whatever the words are.

DR. MAKHIJANI: I just wanted to point out that this, we're no longer talking about the white paper, and to make sure that --

DR. NETON: Good point.

DR. MAKHIJANI: -- there's not a confusion about what we're doing.

MS. MUNN: Yes, it's a different thing and requires different words.

DR. NETON: I think we probably need to go back and look at that in light of that and look at the bioassay records that may be available to help bound that. I know there's lots of tritium data, and I'm sure at least some data for other -- keeping in mind that this is all after 63 years which is when bioassay started.

MS. MUNN: Still appropriate for that to be in chapter five or was the original notation

about being in chapter four?

MR. ROLFES: The comment initially from SC&A was that the TBD does not specify procedures for estimating environmental internal doses in such cases. So it appears that we addressed it as an environment internal dose issue addressed by the white paper that was assembled by Gene.

Gene, do you know if there's any indication or any discussion of this issue within chapter five in the internal dose section?

MR. ROLLINS (by Telephone): No, I don't know. I was just trying to think through this for a moment.

MR. ELLIOTT: Well, we'll take it up, and we'll look at it in chapter five and make sure that, in light of Arjun's correction here for us, if we do address it properly.

MS. MUNN: Well, chapter five's the right place for it.

MR. PRESLEY: Okay, I've got this marked NIOSH will look at the data after 1963 for bioassay and --

MS. MUNN: Correct chapter five accordingly.

MR. PRESLEY: Okay. Moving right along, comment eight, use of 1967 external dose data for 1963 through ’66 is not, was not claimant favorable. I’ve got that marked complete that guidance would be added to chapter six.

DR. MAKHIJANI: I didn’t get that far in volume six, I guess, Mark.

MR. ROLFES: What we have done is incorporated -- let’s see. Everybody was monitored after 1957 at Nevada Test Site by the universal badging and dosimetry program. If there is an issue, it appears that the external dose data for an individual for 1963 to 1966 is inadequate for dose reconstruction. What we would do is use the coworker doses to assign dose to that person. And we’ve incorporated a coworker dose table into chapter six into the external dose technical basis document which we do have copies in front of us now, I believe.

DR. MAKHIJANI: So you’re not back extrapolating anymore?

MR. ROLFES: No, we have measured dosimetry information.

MR. PRESLEY: So we can mark comment eight

complete to be reviewed by the working group.

DR. NETON: I think what we might want to do is identify somehow in the document which sections pertain to which response.

MR. PRESLEY: Boy, that would really help.

DR. NETON: It would help facilitate --

MR. ELLIOTT: Doesn't this response number eight do that, 6.3.2.1.5.3.1?

DR. NETON: Yeah, well, this particular one does.

MR. ELLIOTT: How much more specific do we need to get here?

MR. PRESLEY: You can do it do all of them.

MR. ELLIOTT: I see, okay, I got the point.

MS. HOWELL: I thought that was somebody's social or something.

DR. NETON: I sort of envision like a little yellow highlight.

MR. ELLIOTT: Oh, we could highlight.

DR. WADE: Everybody's doing the right thing.

MS. MUNN: You only have seven points.

DR. NETON: And it overlaps quite a bit.

MR. PRESLEY: Okay, comment nine, lack of environmental external dose data for '68

through ’76. We had that marked see response eight, and I had that complete a long time ago. Anybody have a problem with that?

MS. MUNN: Nope.

MR. PRESLEY: Nine, the TBD does not provide any data pre-’63 external environmental dose.

MR. ELLIOTT: This is ten.

MR. PRESLEY: I mean, this is ten. I’m sorry. I have that marked also complete. Somebody has gone in and added a statement down here at the bottom for unmonitored workers badged in April 1957. And then coworker external dose information has been added to the TBD. TBD page change approved 1/11/07. We have that marked complete. Anybody have a problem? We will review that when it comes down.

MR. CLAWSON: Bob, when you say complete then the work group still needs to review --

MR. PRESLEY: I’ve got it in red here that the work group needs to do reviews, and NIOSH will mark the appropriate sections we need to review in this document.

MR. ROLLINS (by Telephone): If you want to make a mark, that’s section 6.4.1.2, Table 6-

11.

MR. ELLIOTT: We'll just see that it gets added to the matrix.

MR. PRESLEY: Thank you, that will help. Use anything but red, green or purple. That's what everybody else is using.

Comment 11 is a correction factor for external environmental dose due to the geometry of organ relative to badges and the angle (sic) of the dose.

MR. ROLFES: Now, awhile back we did prepare some various dose correction factors for external environmental dose, and what we determined is that all those factors were, in fact, less than one or less than the actual dose conversion factor that we use in dose reconstructions.

And so we didn't think it would be claimant favorable to use a lower dose conversion factor. So we basically are not going to be using the environmental external dose conversion factors in dose reconstructions.

MR. PRESLEY: Is that going to be addressed in chapter five or --

MR. ROLFES: I don't think it warrants an update to the TBD.

MR. PRESLEY: So just no change?

MR. ROLFES: Exactly.

MR. PRESLEY: We don't need to do any review?

DR. NETON: It does say this guidance has been added to the TBD.

MR. PRESLEY: Category.

DR. MAKHIJANI: So this should be in the --

DR. NETON: That's what it says, yeah.

MR. PRESLEY: Just it ought to be in this right here?

DR. NETON: Included in Attachment C.

MR. PRESLEY: We'll need to talk about that at the meeting down the road.

MR. ELLIOTT: It's just not an artifact, that sense is it, Mark? I mean, it kind of seems contradictory to --

MR. ROLFES: Sure. I guess since SC&A asked us to do this, I believe they asked us to document it. And I believe since the work was done it may, if it, in fact, was incorporated into the TBD, it may have just been done to put this issue, to address this issue.

Gene?

(no response)

MR. ROLFES: Gene?

MR. ROLLINS (by Telephone): Yes.

MR. ROLFES: Do you know if the dose conversion factors that were calculated by Rich were incorporated?

MR. ROLLINS (by Telephone): That discussion has been added.

MR. ROLFES: So we didn't incorporate the actual dose conversion factors, but we document it in the site profile that the dose conversion factors were, in fact, less than one for the actual dose conversion factor that we would use from our implementation guide. Is that --

MR. ROLLINS (by Telephone): Correct.

DR. MAKHIJANI: This is not Attachment C. Attachment C is something else, beta photon ratio estimate. I think that you must have changed where you decided to put it. So what's in the response in the matrix, I think it's some place else in this revision.

MR. ELLIOTT: I agree. I think we need to correct our response in this matrix and

provide the exact location of the guidance that's given in the document.

MR. ROLFES: This was from a previous meeting, and we had several attachments that we had for discussion. So the attachment is probably incorrect, and it's not referring to the approved technical basis document now.

MR. ROLLINS (by Telephone): It's actually in 6.4.1.6 now.

DR. ROESSLER: What page?

MR. ROLLINS (by Telephone): Forty-four depending on how your machine paginates.

MS. MUNN: Yeah, it's 44.

MR. PRESLEY: It's not in a TBD right now.

MS. MUNN: No.

DR. NETON: Well, it is on page 45, correction factors for external environmental dose. It's discussed in there. And essentially the language in the comment resolution matrix is lifted right out of this write up.

MS. MUNN: Operation dependent photon fractions.

DR. NETON: I think it's the same issue the working group to review for.

MR. ROLFES: Yeah, on page 46 as Jim has indicated it says that the results of these calculations show that the correction factors for external exposure from environmental radiation fields found at the Nevada Test Site are not significantly different from unity, or one, for most organs. These values are less than one. The new DCFs would not have a significant impact.

MR. PRESLEY: Mark this one complete.

Response 12 has to do with radon dose in G-tunnel are not claimant favorable so it has to do with Gravel Gerties' radon dose. And I marked this complete a long time ago because we went back and discussed it, the use of the Gravel Gerties. Any anybody have anything else on that, Mark, with regard --

MS. MUNN: Did those words go in with respect to the non-use of the Gravel Gerties.

MR. PRESLEY: They were going into chapter four.

DR. MAKHIJANI: Volume four is also being revised and we'll see one or --

MR. ROLFES: If it's not currently in there, we will make sure that it is put in there as

well.

MR. PRESLEY: I'm going to mark this then the working group will review that you'll give us a copy.

MS. MUNN: It almost seems that that last paragraph that's been added to the response here is almost --

MR. PRESLEY: And we're going to mark that complete.

MR. ELLIOTT: I'm sorry. I'm lost. Did we put some guidance in chapter four to this effect that it's --

DR. NETON: We don't know. They're still in draft form. When we issue it, we'll make sure it's --

MR. ELLIOTT: Okay, chapter four is still in draft, okay. So the working group is going to review that.

DR. NETON: We'll make sure when it comes out that it's in there. Point out somehow where it is.

MR. PRESLEY: Review. NIOSH will provide a copy of the document. Everybody agree to that?

(affirmative responses)

MR. PRESLEY: Comment 13 has to do with environmental dose due to Iodine-131 venting. It needs to be taken into account of non-monitored workers. And I have that marked complete with a bunch of question marks. Did you all get your results as provided? Does everybody have --

MR. ROLLINS (by Telephone): The results of the sample calculations that I think we discussed last time?

MR. PRESLEY: Yes, sir.

MR. ROLLINS (by Telephone): That's been added to chapter five.

MR. PRESLEY: Okay, so we need to mark that and review it.

Fourteen, there are no internal monitoring data until late 1955 or 1956, some plutonium from then on, some tritium, mixed fission products. I have this marked as complete, and Mark has added a note here that the TBD team will evaluate the issue on conjunction with the model identified in response five, the resuspension model.

MS. MUNN: That's what we just worked on this morning.

MR. PRESLEY: So there again it should come to us for review and that ought to be complete.

DR. NETON: It does point out in here that prior to ’63 the SEC was granted because of the lack internal data. So we’re really focusing here on ’63 through ’67.

MS. MUNN: Right.

MR. PRESLEY: Fifteen has to do with resuspension of radionuclides by the blast wave, and I have it was. And as I see it that would be complete, and we need to review after you all have had your chance to go back through the data. Is that correct?

DR. MAKHIJANI: Most of this is actually not germane anymore because of the SEC designation.

MR. PRESLEY: So that had to do with what?

Sixteen, use of photon dose that was done by DTRA. That was the basis for our estimating internal dose, where there are no data. I’ve got that marked as addressed today.

DR. ROESSLER: We did that a long time ago.

MS. MUNN: Yeah, it’s done.

MR. PRESLEY: Mark complete?

MR. ROLFES: This initial comment, I believe, was for the atmospheric time period, and during the earlier ’63 as we said we now have an SEC designated for those workers because of the lack of internal exposure information.

MR. PRESLEY: I’ve got that marked complete.

Seventeen, ingestion doses need to be better evaluated, and that was covered. It was complete.

DR. MAKHIJANI: This maybe a little bit different than -- oh, no, I’m sorry. I take that back. The only point here that you separately submitted review of TIB-0018 to you. I was not involved in that, and I actually haven’t read our review. That’s on a separate track.

John?

DR. MAURO (by Telephone): Yeah, I guess I’m a little bit confused here. Ingestion doses, as I understand it, is very much part of Gene’s most recent report and --

DR. MAKHIJANI: It is, but to the extent that --

DR. MAURO (by Telephone): -- and in effect that's the proposed remedy.

DR. MAKHIJANI: Right, but --

DR. MAURO (by Telephone): And that remedy is subject to review and approval by the Board. The fact that we have -- now reference here is made to OTIB-0018, I don't think that no longer has any standing. Is that correct?

DR. MAKHIJANI: That's what I'm confused by. I don't know, since I wasn't involved with that, I don't know what, you know, whether that belongs here or not. You're more familiar with it than I am.

MS. MUNN: I think that the appropriate word used earlier was artifact, isn't it, from when we first started this matrix where we were then as opposed to documents that have been issued specifically for NTS since then.

DR. MAKHIJANI: And that's fine. I mean, I just, then OTIB-0018 should be removed --

MS. MUNN: Yeah, I think so.

DR. MAKHIJANI: -- from here. It's not relevant.

MS. MUNN: I think so.

DR. MAKHIJANI: I mean, I'm not, I haven't

dealt with it so I just don't know.

MR. PRESLEY: So we need to take that out, and I've marked this complete. This is going to be discussed again through comment five's discussion, and it should be added.

Okay, 18, recommended use of ORAU, Technical Basis Document 0-0-0-2 for post-1971 tunnel re-entry workers. And I have that marked complete. That's been done.

DR. MAKHIJANI: This TBD work is for volume five?

MR. ROLFES: I have a note in here that says that we have stated -- let's see, the limitations of the application within section six of the document. And, let's see, I'm not --

DR. MAKHIJANI: Section six of OTIB-0002.

MR. ROLFES: Yes.

DR. MAKHIJANI: Yeah, so we agreed, I think, that that was not applicable to the tunnel re-entry workers, right?

MR. ROLFES: Yes, and I believe that we have alternate approaches such as OTIB-0018 that we would use rather than OTIB-0002.

DR. MAKHIJANI: Yeah, so, I mean, is that

specified somewhere? So I'm a little puzzled that says TBD work completed. But I would imagine that this would go in your volume five revision which is still in draft.

MR. ROLFES: Sure, it has been drafted.

Gene?

MR. ROLLINS (by Telephone): The original problem with that was that OTIB-0002 was being used where, in situations where the OTIB itself prohibited its use. And so the fix for that was to reiterate within chapter five to be diligent in the application of OTIB-0002. And the limitations are spelled out, and we took the limitations that were in OTIB-0002 and specifically put them into chapter five.

MS. MUNN: It says revised guidance to observe limitations has been included.

MR. PRESLEY: I've got down here it's been included in chapter five, and we will review it.

DR. MAURO (by Telephone): This is John Mauro. Just for my own edification, from our previous discussions my understanding was that the primary approach for reconstructing internal doses to workers involved with tunnel

entry is based on bioassay data as opposed to, say, some generic OTIB? Am I correct in that assumption?

DR. NETON: Well, we have bioassay data, yes.

DR. MAURO (by Telephone): Right, and where you don't have bioassay data the approach might use OTIB-0002?

MR. ROLLINS (by Telephone): Well, that's correct, but OTIB-0002 was an efficiency method that we developed early on.

DR. MAURO (by Telephone): Yeah, I recall it, and that was for, if I remember, wasn't that placing upper bounds of denial?

DR. NETON: Right.

MR. ROLLINS (by Telephone): Right.

DR. MAURO (by Telephone): Now so I guess my question, you know, it's probably because I haven't read these things in awhile, so for tunnel entry workers who may have an internal exposure, there is at least some bioassay data that you would use to reconstruct the doses of those workers. But I presume that there are some tunnel entry workers who do not have bioassay data and that there's some protocol

to be followed for those workers to evaluate their internal exposures. Could you just give me a 30-second sound byte on that strategy?

MR. ROLLINS (by Telephone): Typically, where OTIB-0002 became very helpful was like in the case of Hanford and SRS where you had individuals with a great deal of bioassay data, but it was all below MDA. So by applying OTIB-0002 we could say we provided an upper bound because OTIB-0002 provides intakes, I think if I remember correctly, 28 radionuclides.

DR. MAURO (by Telephone): Yes, sure, no, I'm very familiar with it, and it's for the purpose of denial.

MR. ROLLINS (by Telephone): Correct.

DR. MAURO (by Telephone): I guess my question goes toward, okay, we have a worker in a tunnel, no bioassay data, and you want to evaluate. In theory, you could apply OTIB-0002 for the purpose, and you (inaudible) a dose for denial. I may be a little bit confused here, but how do you go about if you decide he needs to be compensated? I mean, are you saying OTIB-0002 will always, there

are any circumstances where you have a worker that's in a tunnel, was not bioassayed, and it's possible he should be compensated?

MR. PRESLEY: Say that again, John.

DR. MAURO (by Telephone): I might be a little confused here, but I'm envisioning something very simple. You've got a worker in a tunnel. He worked in a tunnel. You know that there was some airborne activity, in fact, you may have added some other workers that worked with him that bioassay data were collected, and you reconstruct his doses, best estimates, using his bioassay data. But these other workers don't have any bioassay data, and I guess I'm not quite sure what do you do about that worker.

Let's say you run, now what I'm hearing is, well, in that case you would run OTIB-0002, but is it possible that you'd run OTIB-0002 and find out that you need to compensate this person using OTIB-0002 or that would never occur?

MR. ROLLINS (by Telephone): We could not reach a compensation decision based on OTIB-0002.

DR. MAURO (by Telephone): That was my, that's exactly where I'm headed now. So you run OTIB-0002, and you find out, my goodness, if we, you know, we're getting doses that result in something we need to compensate, but we can't do that because OTIB-0002 was never intended for that purpose. At that point in the process what do you do?

MR. ROLLINS (by Telephone): Well, we have another tool out there called OTIB-0018, which is a method that's in some ways like OTIB-0002, but it's based on air monitoring data.

DR. MAURO (by Telephone): So basically, you're going to assume that the person may have been exposed at some fraction of an MPC.

MR. ROLLINS (by Telephone): Correct, but we can't come to a compensation decision on the use of that tool either.

DR. NETON: John, I think a lot of it gets down to the specifics of the case. I mean, what the guy was doing, how often they were in there, how many re-entries, that kind of stuff. So --

DR. MAURO (by Telephone): So this is all laid out in one, as I said, your protocol, it

may all be laid out there. I haven't read it in some time. I just wanted to get an idea. So what I'm hearing is that for those workers that were tunnel workers, you have a sequence of events.

One, we have the bioassay data. You do, great. You make use of that. You could then at that point go to OTIB-0002 and find out, okay, he doesn't exceed, you're done if he doesn't exceed a POC of .5, you're finished. If he exceeds a POC of .5, what I'm hearing is you may resort to OTIB-0018 which is a more realistic version that keys into MPCs. Is that the protocol that's laid out right now in your dose reconstruction for tunnel workers?

MR. ROLLINS (by Telephone): Correct.

DR. MAURO (by Telephone): Okay, that's all I really need to understand because we will come to a point where we will be talking about OTIB-0018 when we get into the procedures. That's going to be our next meeting at the end of this month, I believe. So I guess the use of OTIB-0018 in that capacity and for that purpose, I guess is best discussed when we

discuss these procedures.

DR. WADE: We're at a break point for lunch?

MR. PRESLEY: Let's break for lunch and come back no later than 1:30.

DR. WADE: And we're going to break contact with the line and dial back in. So we'll dial back in a couple minutes before 1:30. Enjoy your lunch.

(Whereupon, the work group broke for lunch from 12:37 p.m. until 1:37 p.m.)

DR. WADE: This is the work group conference room. We're just about ready to begin. Could I ask if there are any Board members on the call not present here at the table? Any Board members?

(no response)

DR. WADE: Okay, ready to go.

MR. PRESLEY: We will kick back off with comment 19. There are no beta dose data until 1966, the TBD does not specify a procedure for estimating pre-'66 beta dose. And I've got that marked complete because I believe the SEC takes care of that. Is that correct?

MR. ROLFES: No, we have developed some beta/gamma ratios, and we have added those to

the TBD so I guess it would be up to --

DR. NETON: It's fairly extensive beta dosimetry in the new TBD.

MR. PRESLEY: So that needs to be we will get a notice on that.

DR. MAKHIJANI: It's in here.

MR. PRESLEY: Is that in this one? Mark that complete.

Twenty, there appears to have been internal (sic) non-use of badges --

DR. ROESSLER: Intentional

MR. PRESLEY: -- or intentional non-use of badges in some circumstances. We have looked at that. NIOSH, not NIOSH, but SC&A has looked at that. Mark has comments, and I have that marked that we need to address that today.

MR. ROLFES: And there should be a statement in the TBD, let's see, this would be incorporated as a page change into the external TBD basically documenting the prevalence of the intentional non-use of dosimetry, how to identify it in an individual that might have removed their badge, and how to address the non-use.

So what we had proposed to do is we could use coworker information or take a look for a person that was approaching regulatory limits. And if he had consistently for the first three quarters of the year been receiving, say, in his first three quarters if he was approaching the five rem dose, total dose for that year, and suddenly dropped off for the fourth quarter, what we would do or propose is to assign the highest recorded dose in the first quarter, second quarter or third quarter to the fourth quarter. And we feel that that would be a claimant-favorable approach to address this issue when appropriate.

DR. MAKHIJANI: Mark, you're going to do some tests of actual data to see how prevalent it was, and is there any kind of compilation of that information?

DR. NETON: I don't know that we've tested, we did those tests for Rocky Flats where we tried to show the curvature of the probability distribution as you approach the regulatory limit. And we certainly did find that.

DR. MAKHIJANI: You didn't find that?

DR. NETON: We did. We did. But then, you know, the problem with that test is that you don't know whether that's an effect of them removing their badge or whether it's just prudent protection control saying, well, you're reaching a limit, quit working. So I think what Mark proposed here, something much simpler, which is for those, this would only pertain to those who are fairly high-dose individuals to begin with. But if they did tail off in the certain quarter, we would propose as you suggested to consider using the highest quarter prior to the dose tailing off. I think those probability plots are just not sufficiently robust to give you a good sense.

DR. MAKHIJANI: Okay.

MS. MUNN: I can't imagine anyone could argue that as being anything other than claimant favorable. I would argue that it flies in the face of good judgment in terms of good radiation protection practice.

DR. NETON: And to some extent I think this needs to be evaluated almost on a case-by-case basis because you run the situations -- I think I pointed this example out before. The

first NTS case we did was a tunneler who had huge amounts of tritium in his bioassay samples, and then he quit having external badge result readings yet his tritium bioassay samples continued to be elevated.

As you know, tritium clears very rapidly from the body. And so that was very positive evidence that that person was still continuing to work in the environment even though he was leaving his badge on the rack. And in fact, we found letters to congressional staff from his supervisor requesting that the exposure limits be raised because they were, would impede national security work and that.

DR. MAKHIJANI: I've seen some of them.

DR. NETON: So, but those are kind of easy to spot when you see things like that. It's the issue where someone just, many people will state maybe that they did this, and there's no reason for them to do that if they have very low doses. You know what I'm saying? So it really, in these cases, I think applies primarily to people with the doses that are approaching the exposure limit, regulatory limits.

DR. ROESSLER: So when it says here in red if it is indicated in the claim that the worker removed his dosimeter, so you're not actually going to do it that way then?

DR. NETON: Well, we would have to look at it from several different perspectives. I think just an assertion might not be taken a face value if there were other mitigating factors, and you have to look at the whole picture.

DR. ROESSLER: Or you may do it for some that where they don't necessarily have it in the claim but looking at the records it would show that it's suspicious.

DR. NETON: Right, look if the bioassay continued to be sampled and remained high or --

DR. ROESSLER: So that maybe is not --

DR. NETON: So his work assignment certainly would have to be consistent with receiving exposure. There's a number of things one can look at, but this is a sort of a problem that we've had at many sites as you know. Rocky Flats this issue came up. And if a person, if it was convincing that they didn't wear their

badges for whatever reason, then a coworker model as Bob suggested would be, we would treat them essentially as an unmonitored worker at that point.

MR. PRESLEY: We will address this then when section six comes out.

MR. ROLFES: I believe the documented information that we have on this issue was primarily during the SEC time period at Nevada Test Site in the late ‘50s, and this was for people that were critical to the functions. They needed these people to complete the job prior to the moratorium that was fast approaching. And so they didn’t have time to train new people to complete the jobs.

And this is the time period where we have documented evidence. If we find evidence like that or a compilation of various pieces of information that indicate that this occurred, then that would be evaluated on a case-by-case basis, and we will incorporate some instructions on how to address that issue.

DR. MAKHIJANI: Is the documentation that you talked about the same as what Jim was

referring to prior to the moratorium?

DR. NETON: Yeah.

MR. ROLFES: Yes, it was, in fact, I believe in 1959.

DR. MAKHIJANI: I didn't remember it as before the moratorium.

DR. NETON: Well, the tunneling was very early. I don't --

DR. MAKHIJANI: No, the moratorium was in 1958, and it extended into 1960. No, I'm sure about that.

MR. ROLFES: It could have been '58 then. I believe it was 1950-something.

DR. MAKHIJANI: No, the document that you're referring to, if we're talking about the same one, is from '59.

MR. ROLFES: I believe the Advisory Board has the same set of documents.

DR. MAKHIJANI: Yes, I mean, we've talked to this person, and I think this person made a presentation to the Advisory Board actually.

DR. NETON: I might have missed the Las Vegas one.

DR. MAKHIJANI: In Las Vegas. So it's actually part of the public record. The

reason I mention this is that in the interviews that we did, this problem seemed to extend beyond the SEC period into the mid-‘60s or ‘70s. I mean, the people that had different dates when this problem was no longer a big issue. And in two different interviews we got different answers, but both of them were beyond the SEC period.

MR. ROLFES: That’s very possible, but what we would have to do is take a look at the claim and look at the facts of the case on a case-by-case basis. We’re not saying that it didn’t occur. It could have occurred and --

DR. MAKHIJANI: No, no, I mean, it’s interesting that you actually have found documented evidence of this, and that you’ve gone through it and so on. So that settled that issue, and I just wanted to make sure that we’re talking about the same period.

MS. MUNN: To be resolved on a case-by-case basis.

MR. PRESLEY: Twenty-one has to do with the TBD does not contain information about extremity dosimetry. I marked this one complete. It has to do with bomb workers,

assembly workers.

MS. MUNN: There's an OTIB out on them.

DR. NETON: It's in the TBD; it's addressed in the TBD now.

DR. MAKHIJANI: It's in volume six.

MR. ROLFES: I guess I didn't get that part.

DR. NETON: I'm reading the comment. I thought it was. I need to go look and see.

MR. ROLLINS (by Telephone): It's on page 30.

DR. NETON: Thirty? Thank you.

DR. MAKHIJANI: 6.3.2.3.

MR. PRESLEY: Comment 20, we got anybody on? There are no neutron dose data.

DR. ROESSLER: Twenty-two.

MR. PRESLEY: Twenty-two, there are no neutron dose data until 1966 and partial data until 1979. I have this marked complete with some question marks, make sure that we have --

MS. MUNN: The information has been incorporated.

DR. NETON: Attachment D discusses the neutron issues starting on page 117. There's additional neutron discussion within the text of the document. Document D has been added.

MR. PRESLEY: Twenty-three, adequacy of soil data for estimating resuspension, and that should be in Gene's thing with the data to come back to us from NIOSH after they have had a chance to look at that, correct?

MS. MUNN: Uh-huh.

MR. PRESLEY: Twenty-four, presence of high-fired oxides resulting from atmospheric weapons testing and reactor testing needs to be investigated. And I have this marked complete.

MS. MUNN: Yup, the TIB is out.

DR. NETON: And the Department of Labor has been notified of which cases we want to re-look at based on Super-S including those at Nevada Test Site.

MR. PRESLEY: We're waiting on the TBD then.

MR. ELLIOTT: No, no, the TBD is done.

DR. MAKHIJANI: Are there any NTS cases?

DR. NETON: That's a good question. I mean, if there were, they went over. I have not seen --

MS. MUNN: It's all done.

MR. PRESLEY: It's all done?

MR. ELLIOTT: This is under Technical

Information Bulletin for Super-S for highly insoluble compounds.

MR. PRESLEY: TIB, okay.

MR. ELLIOTT: It's already, it's out there.

DR. NETON: I'm not saying the cases have changed, just --

DR. MAKHIJANI: Just as a curiosity which, whether there were any that you thought needed --

DR. NETON: Any case at the Nevada Test Site that was denied that would be re-looked at if it's not SEC.

MR. PRESLEY: NIOSH documentation on site expert review is inadequate. And we have worked with that. SC&A, I think, has looked at the data and --

DR. MAKHIJANI: I sent you a memo on that. I interviewed Mark. I looked at the data on the O drive, and basically, I found that the documentation was incomplete. Mark had an explanation for that. I documented that in the interview, and we have, the explanation was that things that were not relevant were not written down.

But there's been a kind of a little

bit of a difficulty as to how you define that, you know, on the spot. And in any case I didn't find documentation relating to several hours of interviews with Mr. Brady. And I sent you the memo. I don't know what the status of that memo is or whether other working group members have seen it or -- I don't remember. I think I just sent it to you.

MR. PRESLEY: As far as I'm concerned it's complete. You all --

DR. MAKHIJANI: Yeah, it is what it is.

MR. PRESLEY: And it's there.

DR. MAKHIJANI: Perhaps just as sort of a procedural suggestion since Mr. Gibson is considering worker interviews and documentation that might be passed on, there's a whole bunch of comments we've made on this issue that might be passed on to him for his working group's consideration.

MR. PRESLEY: Because I don't think there's any action, nothing to be reviewed or anything else.

DR. MAKHIJANI: No, no, there's no further action on this. I think on both sides we're

complete. It'd done, and whether it had to be reviewed, it's reviewed.

MR. ELLIOTT: Could I just ask for a little clarification though, Arjun? Am I hearing that there were interviews conducted but were not reflected or accounted for in the documentation of who we respond?

DR. MAKHIJANI: Yes, there was quite a bit of confusion about interviews with one person who happened to be quite important. He was a pretty senior person in Health Physics at NTS, and SC&A, I had interviewed him at some length. And that interview published in our review, and I interviewed him in 2005, just prior to, as we were preparing.

He was ill but very lucid and excellent memory, and so he said some very important things. And so the question, and he said that NIOSH had contacted him or contacted him very briefly about one question only, rads, different rads, Roentgens and rads, something like historically.

And then there was quite a bit of confusion as to who had contacted him. And then NIOSH said that there were five hours of

interviews conducted with him if I remember correctly, right, Mark?

MR. ROLFES: Sure, that's correct.

DR. MAKHIJANI: And then so the question was, well, where's the documentation of the interviews and whatever documentation was there was posted on the O drive. And I did not find more information than that in terms of documentation. It seemed --

MR. ELLIOTT: So it's in the O --

DR. MAKHIJANI: That is on the O drive.

MR. ELLIOTT: It's the O drive, but it wasn't evidently referred to in our technical basis document or any, I guess I'm lost or if it's in the O drive, what's the problem?

DR. MAKHIJANI: There wasn't a substantial account of five hours of interviews. It was a reflection that there was a discussion of what's the difference between rads, rems and Roentgens and that was it. And it seemed a little surprising, and the contract, you know, when I interviewed him, he was -- it's no more a statement than that.

There was five hours of interviews conducted, but -- which he did not remember,

and there's -- wasn't a substantial record of that. The difficulty was that there had been prior interviews in which the documentation had not been very good in other reviews that he did. So we just completed this item and submitted it to the chairman of the working group.

MS. MUNN: But we had your notes of your interviews with him, did we not?

DR. MAKHIJANI: Yes.

MS. MUNN: I seem to recall --

DR. MAKHIJANI: Yes, we do.

MS. MUNN: -- recall that a long time ago.

DR. MAKHIJANI: Yes, it's in the site profile review.

MS. MUNN: That's what I thought. So it is on the record, right?

DR. MAKHIJANI: What he said to me and as reviewed by him, we went two rounds just to make sure that I got what he said down correctly, and then we published it, yes.

MS. MUNN: So we have it.

DR. MAKHIJANI: Yes, we do.

MS. MUNN: And it's part of the public record.

DR. NETON: It's .149 of the site profile review.

DR. WADE: Back to Arjun's question of that information coming to the working group looking at the efficacy of interviews, I think it's a good suggestion. How will that happen?

DR. MAKHIJANI: I don't know. I mean, that's your pleasure. I have, Kathy DeMers and I have worked, we've interviewed from our side most of the -- there've been a few other people involved from time-to-time. We could go back and gather up the diverse information and simply give a little bibliography of what we've got to that working group or the various chairmen of the working groups could communicate with Mr. Gibson. I don't have a process in mind, but --

MS. MUNN: I think we have the information already. I don't think there's anything more that needs to be done other than perhaps our group may need to review that one more time. I may need to take another look at it. Personally, I don't --

MR. ELLIOTT: You're speaking as the Chair of the Procedures Working Group?

MS. MUNN: Well, yes, partly, because --

DR. WADE: But there is a work group, a newly appointed work group to look at the efficacy of the interview process.

MR. ELLIOTT: Yeah.

MR. CLAWSON: Perhaps Mike Gibson is the --

DR. WADE: Now who, is anybody on that working group?

MS. MUNN: Not here I don't think.

DR. WADE: So at a minimum, Robert, if you could let Mike Gibson know that this issue has come up and then he could pursue it with SC&A that would be fine.

MR. CLAWSON: Well, and I think what Arjun was trying to get to is how when we do these interviews and worker outreach how we make sure that it gets to Mark and that group.

DR. WADE: If we let Mike know that it's there, I'm sure Mike will contact SC&A and make use of it. We just need to make sure that the alert is given.

DR. ROESSLER: I have one question on this. The other people who are listed here who have been interviewed, who interviewed them and where are the records for that?

DR. MAKHIJANI: All of the records, I found all the records posted --

DR. ROESSLER: On the O drive.

DR. MAKHIJANI: -- that were there. There are quite a few records. I personally -- and many of them were provided to us before, and there's no question that NIOSH did -- just for the record it's important to say there's no question that NIOSH did extensive interviews with Health Physics personnel at the Nevada Test Site and documented many of them.

We have, we do have much of that documentation. We re-interviewed many of the same people, and so there wasn't a question about all the interviews at the Nevada Test Site. It was just --

DR. ROESSLER: This was Mr., the one that you mentioned?

DR. MAKHIJANI: No, the one interview we did had information that became quite central to, have been central to our discussions including this question of non-wearing of badges and so on which also came up in the other interviews. And so it became a little bit important --

MR. ROLFES: I think the issues was --

DR. MAKHIJANI: -- to kind of figure out what the documentation was that was available. That's why we looked into it.

MS. MUNN: Well, my concern here with the wording of the original comment and where we went with that. The comment that the site expert interviews is inadequate. My question then becomes is it inadequate? Was that word chosen simply because one individual was, the reports of interviews with one individual were not as extensive as you expected them to be? Or are you saying that the interviews, is there an inference here that the interviews that were made were inadequate? I didn't get that feeling when I had read this two years ago.

DR. MAKHIJANI: Well, you're pushing my memory now because it is almost two years ago. I will have to, we did an interview with, we did, you know, a question and answer exchange with NIOSH about this, and I believe some of NIOSH's response is documented in that. I don't, I think it is in the context of this site profile which is why this comment is here but may have been some other context.

MS. MUNN: I think it was this one.

DR. MAKHIJANI: But NIOSH informed us that they wrote down things only if they considered them relevant.

MS. MUNN: If they were pertinent.

DR. MAKHIJANI: And we believe that when you're interviewing, I mean, there may be something, you know, personal about their family life or something which you won't write down, but we normally document whatever is said about that site and operation whether we feel it is important or relevant. And then we make a separate judgment about whether to include that in our analysis.

The documentation of the interview is there as to what the person said in its entirety. It's a summary, but we don't omit things on the spot because they're not -- in our judgment it becomes inadequate if you're making judgments on the spot about what's relevant to your analysis and not including it even if the interviewee thinks it's relevant. Because the interview is not about what you think is relevant, but about what the interviewee thinks is relevant. Otherwise,

there's not much point in interviewing them.

MS. MUNN: Well, I am not sure I'd go that far, but what I think I'm hearing is a difference of opinion on what constitutes an interview and how it should be done. And I'm not at all sure that we can, we, either as a working group or as a Board, can devise that kind of characterization.

DR. WADE: But the Board has put forward a work group to look at the issues related to the interview process and how it's used. And they should consider this.

MS. MUNN: Yeah.

MR. CLAWSON: Part of this came out in the meeting in Las Vegas when any of the petitioners and so forth said, yes, they'd had interviews done, but a small fraction of it was put in there. And this is part of why we started this work group is to make sure of how you interview, the workers outreaches, and how it is implemented that it's being done correctly.

DR. WADE: And that's where it belongs with that work group. For this work group, your group's on the interview of the individuals

are included and are now part of the record of deliberations of this group.

DR. MAKHIJANI: That's right. And our closure for the NTS process, this item is closed in the sense that there's no further work to be done here. We've reviewed what needed to be reviewed. NIOSH put up the documentation that they have, and so there's no, I mean, whether it was good or not, good or adequate or not, whatever was done is done and cannot be remedied unless you go and re-interview people who are dead.

MS. MUNN: So this really has gone to the other work group.

DR. WADE: Well, we need to make sure it gets there.

MS. MUNN: This was what, Bill Brady's interview that was the primary concern?

DR. MAKHIJANI: Yes. But there was a more general concern, and I will pull up as we discuss. I can pull up, not the whole thing up, but I will pull up the information for you just to let you know as to where the general comment came from if I can find it. I'll try.

MS. MUNN: Well, that's okay. I don't need

it. I just wanted to make sure I understand just exactly what the language promoted there and exactly what we needed to do with it which sounds like it needs to be referred to Mike's group.

MR. PRESLEY: Got a note to do that.

DR. MAKHIJANI: Yes, I believe it is just for the record. It's on page 109 of SC&A's site profile review, the comment. So there was a more general issue that we raised, and we felt was important that we raised.

MR. PRESLEY: Anybody have any more questions about the matrix?

MS. MUNN: No, I just have one that I didn't get a note on, on comment 18. I noted everything else, but I was too eager to get to lunch I think. What was that action on 18? I think it was just we're going to read section six.

MR. PRESLEY: Work group to review for completeness, chapter five, marked complete.

DR. MAKHIJANI: This one I believe that would be volume five rather than --

MR. PRESLEY: Now, Jim has to depart in

about 20 minutes, but I would like for us to start, if everybody would like to, go through and see who has comments on the ORAU document, 0008-6, at least start it. You, I believe, said you hadn't had a chance to go through this?

DR. MAKHIJANI: Well, I've begun going through it on a very preliminary reading, and, as I mentioned in the morning, this is a very substantially new document with lots of the information that's responsive to the points that were raised. And I did some in preparation for this meeting. I haven't done an analysis of it or anything because the working group hasn't authorized it. I just did a little bit to prepare for this meeting. I believe John's gone through it somewhat.

DR. MAURO (by Telephone): Yes, I have, I've read through all of it except, I think, the attachments. If I recall there was about a little over 100 pages, and so I got through the main body. And it addresses a broad range of issues that we talked about in the past that needed to be addressed. So it's very responsive to a lot of the issues that, when I

say response, it addresses many of the issues that we raised regarding external dosimetry.

However, I guess the meat of it and exactly, okay, the method that they're recommending to use to deal with various external dosimetry issues, a lot of that material is provided in the appendices, and I have to say I didn't get that far, ran out of time. But my reaction when I made my initial read was that it did cover a lot of topics or addressed a lot of topics that we raised in the past which is good. And the degree to which the methodology is adopted to deal with those topics we really haven't had a chance to look very closely at.

MR. PRESLEY: Working group, what do you want to do with this?

MS. MUNN: Well, John, are you going to be able to address those attachments inside the purview of your current requirements?

DR. MAURO (by Telephone): Only if so authorized by the working group. Right now the only action item I have for SC&A is to, is Lynn Anspaugh looking into this dust loading issue. Right now as far as action items as a

result of this meeting for SC&A, that's it. So I really am looking to you as to what you'd like us to do.

DR. WADE: Let's talk a little bit about it.

MS. MUNN: Let's do.

DR. WADE: On two levels. First, before we get specifically to that question, it's always beneficial with a document like this that needs to be reviewed by work group members, if there are any clarifying questions, this would be the time to ask them. Maybe there's no time for that in terms of your preparation, and that's fine. But now look at the path you've laid out for yourself as a work group.

And again, you're pretty far along in terms of the maturity of this work group. You've raised a lot of, SC&A's raised a lot of issues. You've raised a lot of issues. NIOSH has addressed those issues either in this document or in chapter five that you will have soon. And then it's to the work group to review those documents to see if, indeed, the closure you think you have in the matrix has been realized.

So the question is what do you want

SC&A to do in the interim. They could sit idle and do other things, they have much work to do, and wait for the work group to review it, and then you could say to SC&A we think there is still a need for you to review this subset of the items. Or you could ask SC&A to begin now to review all of the items in the matrix as they appear in these documents.

It's up to you as to how you want to proceed, but do you expect to use your contractor again? If you do, when would you like to activate them to the task at hand? And that's up to the work group entirely.

MS. MUNN: I would like for us to consider the possibility since I'm one of the individuals who hasn't had an opportunity to go through this ORAU document, I'd like to have an opportunity to do that. But I'd also like to have an opportunity to try to solidify some of the questions that might exist in it before we have another face-to-face meeting if it's feasible to do so since it appears that John has gotten most of the way through the document and is just now getting into the meat of it.

It seems logical for us to try to identify what lack of agreement still exists after John has gotten through the appendices here and all of us have had an opportunity to review this and chapter five. Perhaps the reasonable thing then is for us to individually bring up any issues that we feel and have a phone conference at some juncture a month down the road, sometime in perhaps early September, something of that sort.

And at least then define what the issues remain. Because if we don't define what the issues are that remain, it's almost impossible for us to say whether or not we want the contractor to do anything else.

DR. WADE: That's a reasonable path forward. You could, the work group could take it upon itself to review the document in front of you, chapter six, relative to the open questions in the matrix. And then have a discussion in about a month's time that each of you would say I would like our contractor to look at matrix item 16 and see if, indeed, they agree with the NIOSH approach relative to the SC&A comment. That's fine. That's a path forward.

DR. ROESSLER: I guess before Wanda mentioned that I had another thought. And that's if SC&A has the time and the budget to do it, it seems they're the ones who could more efficiently do, as someone mentioned, identify the areas that, where there's, agreement has not been achieved, where we have a lack of agreement. And then we could zero in more quickly on what we still need to resolve.

DR. WADE: That's also a reasonable approach.

MR. CLAWSON: This is Brad. You know, looking at this, and I'm not going to pull anybody's leg, a lot of this is pretty... I can sit there and look at these numbers all day, and they're not meaning anything to me. But most of these comments that are coming out here, just looking at it over a third of this stuff that's in our matrix here pertains to portions of this, and they're SC&A's issues. Now I think we've had plenty of discussion today, and we've got a fairly well defined of what the issues are. Myself, I'd like to see them get taken care so that we could come to

closure with this.

DR. WADE: So you're advocating that for every item in the matrix that currently says that has now been addressed in chapter six, you would like SC&A to look at that and offer their opinion as to whether or not it, indeed, has been addressed in chapter six to their satisfaction?

MR. CLAWSON: Correct.

DR. MAURO (by Telephone): Can I ask a question? Does this also apply to Gene Rollins' piece dealing with resuspension? In other words --

DR. WADE: It could.

DR. MAURO (by Telephone): -- so in effect we have a matrix which responds by either making reference to a new chapter six or making reference to the new Gene Rollins' report. So are we, right now -- I'm not writing this down so I've got to get an appreciation for what our mandate is.

DR. WADE: We haven't come quite to that yet, but your mandate could be chapter six and Gene Rollins' report. It could be one or the other. It could be neither. The work group

has to sort of now talk about that and decide.

MR. PRESLEY: This is Bob Presley. One of the things that I'm worried about if we do this is SC&A will take this document, and we'll come up with another 30 or 40 items that we've got to go through back through a matrix and check. I have no problem with SC&A looking at this and commenting, but I don't want to come back in here a month down the road with another matrix and 25 more items that we need to go back and re-do for this.

MS. MUNN: My charge would be -- John, if I were writing the charge to you, my charge would be that you be asked to compare, as Lew had said earlier, the matrix items against the two documents that have now been offered as solutions to that and simply respond whether they do or do not meet your criteria for the original matrix item. That would be my charge if I were writing it.

DR. MAURO (by Telephone): Yeah, and within that context, I guess it would be, we would just offer up a perspective, for example, when we discussed some of the matters earlier, I'll give you an example. One of the things we

talked about with regard to Gene Rollins' report is this high-end value.

The way I see it right now is all we would do is say, okay, we reviewed Gene's report. We noticed that a great deal depends on this one particular measurement made in Region 9 in 1972. And SC&A's perspective is that it's important that we, you know, fully -- perhaps the commentary would go something like this. We believe that a fuller understanding of the degree to which that particular sample is, in fact, representative of the working environment that people were exposed to, that any clean up that may have taken place may not somehow undermine the validity of that being the bounding value.

In other words we would not really do very much except to, I guess, write down many of the things that we already talked about on the phone as being, well, we think that this might be important. Maybe that's just the extent, and get that -- by the way, that's not a, we wouldn't do any research. In other words we would just write down -- because we've been doing this on the run right now.

We read the report. Lynn, myself and Arjun talked about it. We actually may in fact made a very nice list of some of the things, some of his perspectives on this many of which have been clarified as a result of this conversation. What might be helpful is, you know, for us to finish reading both documents and, within the context of the matrix, point out places where some clarification might be helpful.

And I understand that there's a gray line. Does that mean we're going to create a whole bunch of new issues. And I understand that concern, too. So I'm just trying to find the right balance whereby we could provide the working group with a perspective very quickly, within a matter of, say, a couple of weeks, a week or two so that that would part of the, your contractor's perspective on these two documents as they relate to the matrix.

And then as NIOSH, I guess, is in the process right now of looking into many of the matters we talked about, and also finalizing these chapters, that would be part of the material that they have before them.

MS. MUNN: John, in your view wouldn't the discussion between Gene and Lynn with regard to the mass loading help resolve the major part of the question that you have with respect to the not quite half Becquerel reading in '73?

DR. MAURO (by Telephone): Yeah, that would go a long way toward dealing with that and this issue of clean up and the fact that the air sampling was, in fact, taken for the purpose of understanding what the exposures to the workers might have been as opposed to some other purposes. Very often these air samplings are taken to see if, in fact, there's anything moving offsite. Were they taken while the people were working? Now we wouldn't look into that.

I think that as a result of our conversation today it became clear that that's an important, it's important that that number be shored up in terms of, yes, we have documentation that, you know, there was no clean up prior to the time that was taken. Too, we have documentation it was taken at a location where people were actually working so

that it does reflect anthropomorphic activities that might have resulted in elevated levels of airborne dust.

So all of these questions regarding being assured -- I'm using this as one example. So in other words these are, in a way what I'm saying now is this is some of the observations we've made as we read these documents. And they are all, you know, they can all be given a home. Where do they come in? Where do they fit in within the matrix? And they can be made almost as a list.

Where I'm going with this I'm not talking about analysis. We're not going to answer the questions. We're just going to lend areas where we feel there may be some softness in the material we've seen and that might, you know, if it were addressed a little more thoroughly with regard to X, Y and Z, would make for a stronger position. I guess that's what I had in my head.

MR. ELLIOTT: I think that you have clearly before you a finalized technical basis document that responds to the comments that SC&A provided on the original site profile. I

would say to you that the, is it chapter five or the environmental ambient dose and the resuspension model, you know, need to wait until we come back to you with the final document that is similar to this one you have on the table today. And then you can examine how we have addressed the comments that have been provided earlier and from today's conversation.

DR. MAURO (by Telephone): Okay, I understand and that's even better.

DR. MAKHIJANI: Yeah, I think the positions of the white paper and the external dose, I agree with Larry. I think I get the spirit of what he was saying are quite different because first of all the white paper is a step in the long discussion we've had about the same issue and the fine technical points that need to be raised for amending and finalizing that paper have already pretty much been put on the table. There are one or two more things that can be done in an exchange of e-mails.

This external dose document is responsive to a whole list of issues, and as Dr. Roessler said earlier, on those issues the

matrix can be put to bed in the sense that it says the issues have been addressed. And the question I think is that this is a complicated document. I don't know if John's going to get back to you in two weeks, but I can assure you I'm not going to get back to you in two weeks because I think this is a, there are three different beta dose models in here.

Each one of them is, I'm sure took a lot of thought, and I think if we're going to look at it, we should do it the respect and not shoot from the hip and say this is a problem; that's a problem and create 25 new issues that will go away. We need to, if you want us to look at it, I think it should be a considered look that will, otherwise, you know, Ms. Munn has put forward, you know, an alternative approach that you should raise the issues for us to look at, or we can look at the whole document.

But I don't think that this volume, volume six, can be covered in terms of what the response is in a hurry. I think John was more talking about the white paper which I think is a different game altogether.

DR. ROESSLER: I guess I'm, it sounds more open-ended the way you put it. What I was specifically thinking is that we have the matrix today. We went through it, and we said this is closed if. And I think it's those points on the matrix where we said if NIOSH has adequately dealt with this particular item. That's what I'm thinking of is that you concentrate specifically on the matrix and specifically check the items in the new documentation that NIOSH said they were going to do. Make it very specific.

DR. MAKHIJANI: I agree with you. I heard you. All I'm saying is for instance, is one very brief item in the matrix that says there are no beta dose measurements for 196. And a very good portion of this document deals with that one line because there's not measurements, quite an elaborate amount of thought had to be put into what NIOSH was --

DR. ROESSLER: But you direct it to that particular item because that's what the question was.

DR. MAKHIJANI: It was a non-trivial job I'm sure to produce it. And all I'm saying it'll

be a non-trivial job to just look at that one item. If you want us to go through and say, yes, there's some text in here that covers it, I think that can be done in a day. Is there a section number that you can point to that addresses a matrix --

DR. ROESSLER: Evaluate it.

DR. MAKHIJANI: -- item, yes or no. But to actually tell you whether we think it's adequate is going to take some time.

DR. WADE: I think we're closing on the intellectual territory, and I don't think we've agreed at all on the timeframe, but let's, so let's sort of review it.

What we have in front of us is this document which is chapter six. So if you go through the matrix, there are a number of items, say, 12 -- I don't know how many -- that basically say item closed; issue addressed in chapter six. So I think SC&A should start with those items and do the detailed analysis Arjun is talking about and see if SC&A agrees that the item has been dealt with in chapter six and addressed to their satisfaction in chapter six. If the

answer is yes, put a big check. If the answer is no, then you say, no, these questions remain. So that's done.

Now you're waiting then for chapter five. And when chapter five is officially released, then you can do the same thing for chapter five. But that you can't do until chapter five is in front of you. And dealing with the white paper might not be the most effective way to do that.

MR. ELLIOTT: That's right.

MR. PRESLEY: And on chapter five we may be able to sit down as a Board, everybody have a copy and say this is addressed; this is addressed; this is addressed.

DR. ROESSLER: Or the work group.

MR. PRESLEY: Or the work group. I'm sorry, work group.

DR. WADE: So John and Arjun, you understand the charge. That you're to take every item in the matrix that claims that its resolution is contained in chapter six. And you're to review those items to see if you agree that the item is closed based upon what's in chapter six. Say, yes, you agree or, no, you

don't agree. These are the concerns that remain. Is that clear? And you need to take as much time as you need to do a thorough job.

DR. MAURO (by Telephone): That's very clear. And the other half is really not to take any action right now related to the white paper because, and just sit tight until the official --

MR. ELLIOTT: It's a moving target, John.

DR. MAURO (by Telephone): -- and then we'll get our mandate or not after the official version is issued.

DR. WADE: Once chapter five is released, then you can do, the work group, I assume, will ask you to do exactly the same thing for chapter five.

DR. MAURO (by Telephone): Am I correct that Gene's report is for all intents and purposes a draft, early draft of what --

MR. ELLIOTT: A working draft.

DR. MAURO (by Telephone): A working draft of chapter five, okay. So it would be premature for us to be looking at that. I understand. So we're really limiting ourselves right now to matrix items related to

chapter six.

MR. ROLLINS (by Telephone): This is Gene Rollins. I need to clear something up I think. The white paper was to assist in the revision of chapter four.

DR. WADE: We have three chapters in play, four five and we have six.

MR. ELLIOTT: So there are two more chapters to be produced for you. And not to queer the deal here or confuse, but if it would be helpful, we can insert into the matrix the specific text location in the document that we produce. And then if you have that, you may look at it as a working group and say to your satisfaction on an individual basis it reads to your liking or doesn't. Or you may choose that if it's the beta dose analysis modeling that you need to have SC&A look at, you might choose to go different ways with an issue. So if that's helpful, we can put that into the text of the matrix where our treatment of an issue resides in the document.

MS. MUNN: That kind of specification would be enormously helpful. Thank you.

MR. PRESLEY: Yes.

MR. ELLIOTT: So we'll strive to toward that then.

DR. NETON: I would offer in the spirit of efficiency that we can have technical working group exchanges during this if SC&A has issues that they want to discuss that are, need clarification or confusing.

MR. PRESLEY: I had thought you would do that.

DR. NETON: Those have worked well in the past for getting things through a log jam if it becomes an issue rather than wait a month.

DR. MAKHIJANI: You and I have had the most efficient calls.

DR. NETON: We do well.

DR. WADE: Everybody understand?

MR. PRESLEY: SC&A will review chapter six and will get back to the working group on items that pertain to the NTS matrix is what I have here.

DR. WADE: I would state it the other way. That SC&A will look at the subset of matrix items that are answered in chapter six purported to be answered in chapter six and will answer the question are they adequately

addressed in chapter six.

DR. MAURO (by Telephone): To further on that, I assume we sit tight until we see this revised version of the matrix where, you know, it's more explicitly points to the sections of chapter six as was just mentioned earlier --

DR. MAKHIJANI: John --

DR. MAURO (by Telephone): -- on that as opposed to taking the action now using the current version of the matrix.

DR. WADE: That's open for discussion.

DR. MAKHIJANI: It's not necessary, John. I think it's quite clear. I mean, this will be forthcoming relatively soon I presume.

MR. ELLIOTT: My offer was for chapter four and five, but you know, if it's helpful to the Board, I think we could go in --

DR. WADE: Yeah, you should go on chapter six with what you've got. Four and five, it would be good to start that.

DR. NETON: Because starting with chapter six is if we start pointing out individual sentences, then you're going to lose the totality of what we said in there because it may exist in several places now.

DR. MAURO (by Telephone): Oh, okay. That's why I asked the question. So what I'm hearing it's not going to be that much more help to try to identify all the different places. Just a matter of here's the issue. It's answered in chapter six. We're just going to take a look at chapter six.

DR. NETON: Right, there's a neutron section, a neutron appendix. I mean, it's going to be in there if it's a neutron issue.

DR. MAURO (by Telephone): Gotcha, okay, I understand.

DR. WADE: And then pending the receipt of that and then the completion of chapters four and five, then the work group can decide when it next wants to get together, possibly by the phone or possibly face-to-face.

MR. PRESLEY: It looks to me like it's going to be maybe some time near the end of September.

MS. MUNN: Well, that's getting us awful close to the October meeting.

MR. PRESLEY: Larry's already stated that he's up against the wall right now on some of this stuff.

DR. WADE: Well, again, there are two pathways. On chapter six SC&A can start right away, and they can let you know. Once chapters four and five are done then the work group needs to decide how it wants to engage SC&A on that. It might be able to do that on a phone call, might want to get together. I don't know. That's up to you.

MS. MUNN: But there's not, if the work that needs to be done on six is not going to be any more overwhelming than what we've identified that it will be, then it would seem beneficial to be able to have a phone call getting the input of the respective individual members of the work group with respect to their view on whether or not their concerns are addressed her and getting an update on where SC&A and NIOSH are with that. It would be very helpful if we could do that midway between now and the next meeting. I don't know whether that's --

MR. PRESLEY: But to do that NIOSH has to get that --

MS. MUNN: I guess the bottom line question is --

MR. PRESLEY: -- complete?

MS. MUNN: No, no, I'm just talking about six. I'm just talking about six. It would be nice if we could get that off the table before the next, at least get identified clearly whether there are any remaining issues on that.

DR. WADE: So as always, John, the question comes to you now of when do you think you'll be prepared to report on the task you've been given today?

DR. MAURO (by Telephone): Well, I would like to caucus with Arjun and our other external dosimetrists to finish reading the report, and that may take a day or two just to read it, and so that we get a sensibility of the scale of the problem. And then I will get back to the working group let's say toward the end of -- today is Tuesday?

If I can get back to the working group toward the end of this week to lay out when we think we'll be able to send in our commentaries on chapter six and give you a date. I'd hate to try to set a date right now. I notice I mentioned two weeks, and I got a reaction from Arjun which is I

understand. I really don't know until we finish reading it what we're about to take on.

DR. WADE: Okay, so if you do that, then the Chair of the work group can look at that, and if it looks reasonable to schedule a call a week after that date within the timeframes Wanda mentioned, then I would say do it.

MR. PRESLEY: How many of us are going to be up here for that Procedures meeting in Cincinnati on the 29th?

MS. MUNN: Me.

MR. PRESLEY: And I am.

DR. MAKHIJANI: I'm going to be here.

DR. MAURO (by Telephone): I'll be at the 29th meeting.

DR. WADE: Brad could call in.

MR. PRESLEY: Brad could call in and the same way with Jim. We're going to be here. Wanda and I have to be here for that Procedures group.

DR. WADE: That presupposes that John's material will be to you before then.

MR. PRESLEY: Either the 28th or 29th.

MR. CLAWSON: That will all depend on John, what he brings out the end of this week, but

we can, after what John says, we can shoot for that.

DR. NETON: It would be nice if NIOSH would have a chance to react as well because what will happen is SC&A will present something, and then we'll say, well, we just read this.

MR. PRESLEY: I want to make sure that you all, I don't want to come up here like we did today and --

DR. MAKHIJANI: Mr. Presley, part of the goal is to have as many items resolved without further work and further revisions. And it is most helpful to have the greatest clarity between us as to what was being said. And in the past Jim has mentioned that we've had some good luck with just resolving issues without even having to bring them up because it was something that we thought was being said that wasn't being said, but it was something else. There was more data some place else that we hadn't seen or something like that.

And there is one external dosimetrist that we haven't even seen this document. We haven't touched based with him on his schedule. So I think it's a, it's your

pleasure, but I just -- this is, from my half, look at half of it, the reason I didn't, normally, I turn the pages and at least try to reach the end before. But this thing is a complex thing, and I couldn't turn the pages to reach the end because I wouldn't be able to say anything about any page. So it's an unusually difficult document.

DR. WADE: Let me propose this. What about at a certain time next Wednesday, we have a mini-conference call between John Mauro, the Chairman, Jim and I. We assess the situation and decide what would be the appropriate action in what timeframe.

MR. PRESLEY: That Wednesday, the 15th?

DR. WADE: I was picking a day to give everybody a chance to, Wednesday, the 15th. Does that work?

I didn't hear that.

DR. MAURO (by Telephone): That's fine with me. By that time we certainly should have a pretty good idea of what our, the level of effort that's going to be necessary to provide you with our commentaries.

DR. WADE: And who do you want us to use as

a NIOSH point of contact, you or Jim, Larry?

MR. ELLIOTT: Jim is fine.

DR. WADE: Okay, so let's say at one o'clock eastern time on the 15th. One o'clock eastern time on the 15th. At a minimum the Chairman, John Mauro, myself and Dr. Neton will have a call.

MR. ELLIOTT: And Mark, I'd like Mark.

DR. WADE: And Mark. And at that point we'll say how's it looking. And based upon that say let's try for a phone meeting on the 29th or --

MR. PRESLEY: Can you send a thing out on that?

DR. WADE: Yes.

Could I ask you, Jim, to do that?

DR. NETON: Sure.

MR. ELLIOTT: Call-in number.

DR. NETON: Do you want me to send an e-mail to the work group? Let me get the attendees down. I wasn't --

MR. ROLFES: I can take care of that.

DR. NETON: Mark's got it.

DR. WADE: Well, that's good.

MS. MUNN: Don't set your upcoming date on

the 29th. I can assure you the work group is going to take the entire day.

DR. WADE: Well, then Robert can then communicate. Once he decides he can communicate to the work group his proposal.

MR. PRESLEY: If somebody wants to sit in or listen on to what's going on.

DR. WADE: So, Mark, if you would put out, give the rest of the work group the information as well, but with no requirement that they call in unless they're curious.

MR. ROLFES: Okay, all right. I'll cc the work group.

MS. MUNN: My calendar says that we have a full Board call scheduled the 4th of September.

DR. NETON: Correct.

MS. MUNN: In any case, I have no feel for how full that dance card's going to be.

DR. WADE: Not too full. I'm thinking that's not going to be too full. So I think the afternoon of the fourth, though we probably wouldn't start until 11:00. But I would say by one or two we should be done because the agenda isn't looking full to me for a call. There's lots of things we can do,

but we can't do many things on a call.

MS. MUNN: That's right.

DR. WADE: So that's a possibility of using some time then afterward.

MR. PRESLEY: What I have then is action items is mass loading and dust sampling. Comment on the clean up of Area 9. NIOSH will look at the problem and get back with the working group. And when, where and why air samples were taken at NTS.

MR. ELLIOTT: Yeah, we're going to address all of those in our chapter four, five, four and five.

DR. NETON: Resuspension goes to four.

MR. PRESLEY: And the matrix goes away except for Arjun has to look at the --

MR. ELLIOTT: There are issues in the matrix that go to chapter four and five.

MR. PRESLEY: We'll keep an eye on them.

DR. MAKHIJANI: Just going through it today I'm pretty confident that whatever items we've raised --

DR. NETON: There's something in there. It's just whether or not it's --

DR. MAKHIJANI: --there's some text in here.

Just reasonably clear so basically it's the review that remains. So from that point of view the matrix items will get closed in that there's some text in there.

MR. PRESLEY: And I'll let Mike Gibson know about the interviews and the clarification of the NTS interview data.

Anybody else have anything else?

(no response)

MR. PRESLEY: Mark?

MR. ROLFES: I have nothing else. I know there's many issues that are debated, you know, that we've put on the table. And there's different approaches to complete a dose reconstruction. We are trying to get the claimants a timely answer. That's the bottom line. And we want to make sure that the compensation decision is correct. Many of the issues that we are discussing can be discussed for years to come, and we are trying to address these, you know, as expeditiously as possible so that we are providing timely responses to claimants. Many of the issues that we're discussion are not going to affect compensation decisions, so there is always

going to be, you know, a person that is reviewing each claim to make sure that we have been claimant favorable so that we are verifying that the compensation decision is correct. And I want to keep that in mind with, you know, a good path forward for this document so that we can be expeditious and make correct scientific decisions.

DR. WADE: Well said.

MR. PRESLEY: I appreciate that.

MS. MUNN: Are we done for the day?

MR. PRESLEY: I have nothing else.

DR. NETON: Are we going to sign off here?

MS. MUNN: I think so.

DR. WADE: Goodbye out there.

(Whereupon, the work group meeting adjourned at 3:50 p.m.)

CERTIFICATE OF COURT REPORTER

STATE OF GEORGIA

COUNTY OF FULTON

I, Steven Ray Green, Certified Merit Court Reporter, do hereby certify that I reported the above and foregoing on the day of August 7, 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 17th day of October, 2007.

_____

STEVEN RAY GREEN, CCR

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