

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 at the Marriott Airport, Hebron, Kentucky, on July 25, 2006.

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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)/ signifies speaker failure, usually failure to use a microphone.

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P R O C E E D I N G S

(10:00 a.m.)

WELCOME AND OPENING COMMENTS

DR. LEWIS WADE, DFO

1 DR. WADE: Good morning, everyone. This is Lew Wade.
2 I'm the Designated Federal Official for the
3 Advisory Board, and I'd like to welcome you all
4 to this working group meeting of the Advisory
5 Board. This is a working group that's ably
6 chaired by Robert Presley, has as its members
7 Brad Clawson, Wanda Munn and Gen Roessler. And
8 this working group is focusing upon issues
9 related to the Nevada Test Site site profile
10 and the review of that document by the Board.
11 Before I make some opening comments, I'd like
12 to go around the table here and identify
13 everyone who's here, and then I'd like to have
14 members of the federal government who are on
15 the line, other Board members, if there are
16 representatives of SC&A on the line I'd like
17 them to identify themselves, then anyone else
18 who's on the line who would like to identify
19 themselves, that would be fine. And please, as
20 we go through our deliberations, anyone on the

1 line, if you have trouble hearing us at any
2 point, please just shout out. You know,
3 positioning the microphones and maintaining a
4 high volume is something we'll focus on, but
5 please don't let us go too far without
6 reminding us that we need to make some
7 adjustment.

8 Again, this is Lewis Wade. I work for NIOSH.

9 **MR. PRESLEY:** Robert Presley, Board member.

10 **DR. ROESSLER:** Gen Roessler, Board member.

11 **MR. ROLFES:** Mark Rolfes, NIOSH.

12 **MS. MUNN:** Wanda Munn, Board member.

13 **MR. HINNEFELD:** Stu Hinnefeld with NIOSH.

14 **MR. ROLLINS:** Gene Rollins, DMA, subcontractor
15 for NIOSH.

16 **MS. BRACKETT:** Liz Brackett, ORAU team.

17 **MR. MCFEE:** Matt McFee, ORAU team.

18 **DR. MAURO:** John Mauro, Sanford Cohen &
19 Associates.

20 **DR. MAKHIJANI:** Arjun Makhijani, SC&A.

21 **DR. WADE:** And Brad Clawson, a member of the
22 Board, has just stepped away from the table.
23 Brad will be with us in a moment.

24 Might I have other members of the NIOSH or ORAU
25 family introduce themselves? On the tel-- on

1 the telephone line.

2 **MS. THOMAS:** This is Elise Thomas and I'm with
3 the ORAU team.

4 **DR. WADE:** Okay. How about other Board members
5 who are on the line?

6 (No responses)

7 Members of the SC&A team?

8 (No responses)

9 Any other SC&A members on the line?

10 (No responses)

11 Are there other federal employees that are on
12 the line participating in this as part of their
13 work?

14 (No responses)

15 Okay, I assume that there'll be others that'll
16 join us through the course of the call. Again,
17 as a working group we cannot have a quorum of
18 the Board present; otherwise it becomes an
19 official Board deliberation and, by my count,
20 we do not have a quorum of the Board present so
21 I think we're in good shape to continue.

22 Let me make some -- some opening comments. We
23 will, once I finish my opening comments, go
24 around and have Board members, NIOSH/ORAU team
25 members and SC&A members identify whether or

1 not they have any conflict with regard to the
2 Nevada Test Site. As you know, the Board's
3 procedures with regard to conflict of interest,
4 if there is someone who's conflicted -- a Board
5 member conflicted relative to a particular
6 site, they can participate in discussions
7 concerning that site but they cannot make
8 motions or vote.

9 With regard to ORAU, NIOSH and SC&A, we would
10 want anyone with a conflict to disclose that
11 conflict before we have our discussion so that
12 everyone can realize the nature of the conflict
13 and can factor that in as they would like to
14 their consideration of the words spoken by the
15 person with the conflict.

16 Again, this is a deliberation -- a meeting to
17 discuss the Nevada Test Site. I thought I'd
18 just give you a little bit of context of what's
19 going on with regard to the Nevada Test Site
20 overall. At the last Board meeting the Board
21 took action on a petition that NIOSH had
22 generated. This is an 83.14 petition for the
23 Nevada Test Site that, as my notes show, went
24 from 1951 to '62. The Board recommended
25 approval. The Secretary has acted consistent

1 with the Board's recommendation. The
2 Secretary's recommendation is before Congress,
3 and I think the 30 days runs out, if I'm not
4 mistaken, the 26th of July. I can't imagine
5 that the class will not be added to the cohort,
6 but again, it hasn't happened yet. I think
7 we're just days away from that.

8 If you recall, there was an open issue that
9 surrounded that petition that the Board still
10 is deliberating upon, and that is -- the
11 petition dealt with the 250 days as criteria
12 for -- for a membership in the class. We have
13 heard from the Department of Labor that they're
14 prepared to do the arithmetic that would say
15 250 days at the Nevada Test Site quite possibly
16 means 250 divided by three because there were
17 people who lived at the Test Site. So I think
18 that issue has been resolved.

19 The Board still is looking into the issue of
20 whether it should be something less than that,
21 250 days divided by three, should it be
22 presence or should it be something between
23 presence and some number, and that issue
24 remains to be discussed. The Board has a
25 working group chaired by Dr. Melius that is

1 slated to look at that issue. That working
2 group is supposed to work in close harmony with
3 the working group chaired by Robert Presley. I
4 don't believe that working group has held any
5 discussions to this point.

6 I was told by Stu Hinnefeld this morning that
7 NIOSH is just in receipt of another SEC
8 petition -- this is a petitioner filed
9 petition. It has not qualified. It is in the
10 process of being reviewed. I assume it deals
11 with a period later than the '51 to '62
12 petition that the -- the Congress is to act
13 upon this week.

14 Another issue related to Nevada Test Site is
15 several Board meetings ago SC&A informed us
16 that a part of their corporation had taken on
17 some contract work to do dose reconstructions
18 for DTRA, and this created an issue of a
19 potential conflict of interest with regard to
20 SEC petitions or dose reconstructions or site
21 profiles. And we were -- we were keeping SC&A
22 from any work with regard to the Nevada Test
23 Site and Pacific Proving Grounds until those
24 issues were resolved. The short of it is, the
25 issues have now been resolved.

1 conflicted.

2 **DR. WADE:** Liz, could you tell us just briefly
3 as to your involvement?

4 **MS. BRACKETT:** I reviewed their technical basis
5 document for internal dosimetry and I was
6 involved in -- I don't recall, I -- I --

7 **THE COURT REPORTER:** Could you speak up,
8 please?

9 **MS. BRACKETT:** Sorry, I have a cold. I can't
10 speak very loud right now. -- and I did one or
11 two dose assessments for them.

12 **DR. WADE:** Anyone else on the line from NIOSH
13 or ORAU that has a conflict?

14 (No responses)

15 Okay. The last thing I'll bore you with in
16 terms of my words are that, if you recall, at
17 the last Board meeting Professor Lynn Anspaugh
18 with the University of Utah made comments to
19 the group. I've been in contact with Professor
20 Anspaugh and he very much wanted to participate
21 in this call. But on Sunday I received an e-
22 mail that I'll read to you from the Professor.
23 It says (reading) Dear Dr. Wade, as discussed
24 with you previously, it was my plan to be on
25 the conference call tomorrow. Now however I

1 will be driving in the boondocks of Utah so I
2 will not -- it will not be possible. I
3 continue to have a keen interest in the Nevada
4 Test Site dose reconstructions, et cetera, and
5 I do not think that the current site profile
6 adequately captures the nature of the
7 activities and the potential for episodic
8 exposures. Regards, Lynn Anspaugh.

9 I'll read that last part again -- let me find
10 it. (Reading) I continue to have a keen
11 interest in the Nevada Test Site dose
12 reconstructions, et cetera, and I don't think
13 the current site profile adequately captures
14 the nature of the activities and the potential
15 for episodic exposures.

16 I only read that because, again, the Board and
17 the working group has always felt it better to
18 be informed by the opinions of anyone who might
19 have them. That's the Professor's opinion and
20 now it's on the record.

21 That ends my long introduction. Robert, it's
22 all up to you.

23 **INTRODUCTION BY MR. PRESLEY, CHAIR**

24 **MR. PRESLEY:** Lew, thank you very much. What I
25 thought we'd do today is start through these --

1 start through the comments first. I'm not one
2 to make a long matrix. We agreed to comments.
3 If SC&A would like to comment first and then
4 NIOSH, what we'll do is go off of NIOSH's
5 document. John, if you've got a comment, you
6 want to go first, and then Mark, and go through
7 NIOSH's comments.

8 **DR. MAURO:** Yes. John Mauro, I'll be very
9 brief. First of all, I appreciate the package
10 that was put together. It was extremely
11 helpful. I went through it and my first
12 impression -- and I'd like Arjun also to weigh
13 in -- is that it looks like that we're pretty
14 close. That is, by and large, out of the many
15 issues that are -- I didn't really get a count
16 -- that the developing -- the -- between the
17 fact that the -- the SEC petition is pending
18 for the pre-19-- 1962 and earlier, that
19 resolves a lot of the concerns that we raised
20 earlier. Except I believe for skin dose and
21 prostate cancer, the other cancers. I think we
22 -- I think we -- we do need to discuss what the
23 implications of that is for the time period
24 covered by the SEC.
25 For the time period following 1962, my sense is

1 that two issues have struck me as -- as areas
2 where we do need to have some discussion and
3 perhaps some protracted discussion. That has
4 to do with one of the issues Dr. Anspaugh had
5 raised related to mainly reconstructing the
6 doses from deposited radioactivity on the
7 ground to workers, using the data that
8 currently is available, with the special
9 consideration of a resuspension of particulate
10 material, perhaps the episodic venting of
11 radionuclides from underground testing, and the
12 -- so those two sort of struck me as areas that
13 it looks like we're a little fuzzy on on how in
14 fact they will be dealt with. We -- we do have
15 some questions regarding that.
16 And the other area that Arjun actually reminded
17 me of was that -- a result of the interviews
18 with Mr. Brady and others having to do with
19 some questions on data reliability. So I guess
20 in a nutshell, that sort of captures my
21 sensibilities regarding where we are on this
22 site profile.
23 And Arjun, please, if you have anything you'd
24 like to add...
25 **DR. MAKHIJANI:** No, there are -- those are --

1 those are the big ones, I think. There are a
2 number of smaller issues, like beta dosimetry
3 until 1966. But a large number of the areas
4 where -- where NIOSH has said that they're
5 going to revise the TBD or have a new procedure
6 or look at the Naval Radiological Defense Lab
7 literature and come up with a method --
8 essentially, for -- so far as we're concerned,
9 the issue is resolved until we see the new
10 procedure and if the Board wants us to review
11 that new procedure. There -- there are a few -
12 - few items outstanding.

13 **MR. ROLFES:** All right. Well, I'd like to
14 thank Gene Rollins, as well. The credit goes
15 to him and his team members. They put this
16 together and I was merely the go-between, so I
17 guess what we can do is go ahead and, if you
18 would like to identify your comment and we can
19 identify our response, and then we can open it
20 up for discussion if necessary.

21 **DR. MAKHIJANI:** Would you like me to go down
22 the list one by one 'cause I kind of made a
23 little table as to where we're basically
24 saying, for now, resolved until -- or resolved
25 or some outstanding issue. Would you like me

1 to do that?

2 **MR. PRESLEY:** What I -- what I would love to do
3 is when we have an issue today that is
4 complete, that we mark that issue complete and
5 we don't go back and revisit it unless
6 somebody's got something that's dire wrong with
7 it. I'd like to get as much done as we
8 possibly can.

9 **DR. MAURO:** Procedurally, one of the things
10 we've been talking about is -- as you know, we
11 work off a six-step process and right now we
12 are in step six in terms of issue resolution.
13 One of the things we're not quite sure of is
14 whether or not you folks would be asking for a
15 seventh step, that being once the -- right now
16 there are commitments made. Basically yes,
17 we're going to revise the TBD to reflect X, Y
18 and Z. At some point in the process the TBD or
19 a TIB will be issued to address an issue. By
20 the way, this is a recurring theme. This is
21 happening with Bethlehem Steel and others.
22 Whether or not once that is done and the new
23 material is now on the web, in place and is
24 functional, whether or not there -- you
25 envision that there will be a step -- I guess

1 it's a judgment call once it happens -- a step
2 involved -- okay, yes, that in fact does meet
3 the intent of our concerns; or yes, it looks
4 like the issue has in fact -- now can be closed
5 out. So in other words, some of those -- where
6 do we -- at what point do we close out an
7 issue, when the commitment is made to address
8 an issue and we all agree with the basic
9 strategy and principle upon which that issue
10 resolution is to be implemented, or until it is
11 in fact implemented?

12 **MS. MUNN:** This is Wanda. I thought that was
13 one of the issues that we were dealing with in
14 the other working group, also, the -- the issue
15 of when is done done. And I -- the concern
16 that we had been expressing in that other group
17 was that, to our -- to the best of our
18 knowledge, NIOSH did not have a specific
19 process or a specific person who tracked
20 outstanding issues and when they were complete.
21 Now whether that's been resolved since our last
22 other working group meeting, I don't know. But
23 does -- does anyone here --

24 **DR. WADE:** I can speak to that. I can speak to
25 it generically and then specifically I think as

1 well, if we take Bethlehem Steel as an example.
2 I think that there is a six-step process and
3 then John defines a seventh step. I think in
4 the Bethlehem Steel case NIOSH is reporting to
5 the Board on a regular basis the closing out of
6 issues. And I think then it falls to the Board
7 to decide if it accepts NIOSH proposal or -- or
8 NIOSH's statement, or if it wants SC&A to look
9 into an issue again.

10 **MS. MUNN:** That was my understanding, was that
11 step seven, as I understood John to define it
12 just now, was a Board action, not an SCA
13 action.

14 **DR. WADE:** But it could be -- it could be --

15 **MS. MUNN:** That was my understanding from the
16 other working group.

17 **DR. WADE:** That's my understanding from --

18 **MS. MUNN:** Whether we accept that here as being
19 our definition in this group is another thing.

20 **DR. WADE:** But it doesn't preclude the Board,
21 though, saying to SC&A that this is a very
22 complex --

23 **MS. MUNN:** No.

24 **DR. WADE:** -- issue, could you look into it and
25 report back to us --

1 **MS. MUNN:** Yeah.

2 **DR. WADE:** -- so I think at the end of the six-
3 step process the Board sits with the
4 information and has to decide the final word.
5 It could well, you know, extend the process by
6 going to SC&A.

7 **MS. MUNN:** And -- and my understanding was that
8 the Board wanted to see from NIOSH a
9 prescriptive method for identifying this
10 outstanding item, this outst-- that you said
11 you'll do this; when do we know that it's done.

12 **DR. WADE:** Right, and I think NIOSH is
13 intending to follow up with the matrix carried
14 out to the extent that items fall away and then
15 there's these precious few left, and then NIOSH
16 will bring that to the Board and when it's all
17 done the Board can decide whether it accepts it
18 or wants some further issue looked at.

19 **MS. MUNN:** Yeah.

20 **DR. WADE:** Robert, is that your understanding?

21 **MR. PRESLEY:** That's my understanding.

22 **DR. WADE:** Thank you, Robert.

23 **MR. PRESLEY:** I like that. Do you want me to
24 read the comments to start with, or --

25 **MR. ROLFES:** Either way, that'd be fine -- you

1 or -- or John or Gene.

2 **MR. PRESLEY:** Have you got -- you've got --
3 you've got it. Why don't -- why don't you read
4 the comments.

5 **DR. WADE:** Could I just make one other comment,
6 just to complete the record? The Board has --
7 really gives the latitude to the Chair of the
8 working group as to -- you know, when to make
9 that call or -- or the Chair of the working
10 group can well work with me to assign SC&A
11 further tasks, so each Chair of the working
12 group will be able to exercise that
13 prerogative, as well as the Board as a whole
14 when it meets.

15 Okay. Sorry.

16 **INCOMPLETE RADIONUCLIDE LISTS**

17 **DR. MAKHIJANI:** These comments are from the
18 matrix that SC&A prepared and which was a
19 summary of our site profile review, and I think
20 submitted to the Board and NIOSH in January of
21 2006. And the first comment is some
22 radionuclide lists are not complete. This is
23 especially important for atmospheric testing
24 and for early re-entry workers.

25 And then NIOSH broke it down to four -- four

1 categories. Mr. Presley, should I just go
2 through the four categories?

3 **MR. PRESLEY:** Yes, please.

4 **DR. MAKHIJANI:** In -- in the first category,
5 which could more broadly relate to atmospheric
6 testing and re-entry workers, NIOSH agreed that
7 it's going to revise the table of radionuclides
8 so that it would be more complete and republish
9 it. So this is one of those items where NIOSH
10 will take an action and the Board could decide
11 whether it wants further review. For now, so
12 far as we're concerned, NIOSH's response is
13 fine. We think it needs to be revised and
14 NIOSH agrees.

15 The second response of NIOSH is there's a
16 problem table that needed adjustment, Table 2-
17 8, and they're going to remove that from the
18 TBD, which is fine with us 'cause it was
19 somewhat duplicative anyway and did not show
20 time dependence, where the other tables do show
21 time dependence, which are more complete.

22 And then the third and fourth responses related
23 to atmospheric testing workers, which have been
24 rendered moot by the SEC recommendation of the
25 Board and of NIOSH.

1 So I think the summary of the first comment is
2 basically we agree with the way that NIOSH has
3 decided to deal with it. There's one pending
4 action item for NIOSH.

5 **DR. WADE:** Arjun, could I ask a question? It's
6 really never my role to ask technical
7 questions, but just sort of as the gatekeeper
8 for the Board, I did mention that we have this
9 issue of the 250 days or presence left for the
10 Board to consider. Does 1c in any way impact
11 upon that?

12 **DR. MAKHIJANI:** Yes, Dr. Wade, some of the
13 radionuclide issues that are involved in this
14 table involve very short-lived radionuclides,
15 so the amount of dose highly dependent on time
16 of tunnel re-entry, for example, or for
17 atmospheric testing workers, when exactly they
18 went in because there are some -- some
19 radionuclides that have half-lives of hours or
20 a few days, and it's -- it's in relation to
21 those that there are some important questions.

22 **DR. WADE:** Okay. Thank you.

23 **MS. MUNN:** And that raises a question for me.
24 Are our -- are the personnel records adequate
25 for us to be able to determine who actually

1 went in when? Can -- can we do that?

2 **DR. MAKHIJANI:** Ms. Munn, I have -- I have not
3 looked at personnel records --

4 **MR. ROLFES:** I can answer that. Yes, they are.

5 **DR. MAKHIJANI:** -- in that much detail.

6 Perhaps --

7 **MS. MUNN:** They're -- they're --

8 **MR. ROLFES:** They keep logs of all re-entries.

9 **MS. MUNN:** I know that they did, but I wasn't
10 sure whether we could identify by employee. We
11 can.

12 **MS. BRACKETT:** I knew they had information.

13 **MS. MUNN:** Good, that helps so that we don't
14 have to wonder whether this individual was or
15 was not involved in re-entry. Yeah.

16 **DR. ROESSLER:** So back to the second comment,
17 that table that's been removed is not -- not a
18 useful table, it was --

19 **DR. MAKHIJANI:** Well --

20 **DR. ROESSLER:** -- duplicative and...

21 **DR. MAKHIJANI:** Yeah, well, I'd have to go back
22 to the TBD, but I think that this table did not
23 -- did not show any time dependence at all, so
24 -- in my opinion -- from the kinds of issues
25 that we're discussing in terms of dose

1 reconstruction, not a useful table. If there's
2 a consolidated table that shows time dependence
3 of all radionuclides that are involved, then
4 that will be a good point for dose
5 reconstruction and not be confusing and having
6 too many tables of the same thing.

7 **DR. ROESSLER:** Okay. Thanks.

8 **DR. MAKHIJANI:** So I'm okay with that.

9 **DR. ROESSLER:** Okay.

10 **MR. PRESLEY:** I had one comment on 1b (sic)
11 myself about -- where it says concentrations
12 should be estimated by hour for the first day
13 and by day after that. Where do we -- huh?

14 **DR. MAURO:** Yes, you're correct, that was
15 further comments, not the main body.

16 **DR. MAKHIJANI:** Oh, that's 1c, you mean.

17 **MR. PRESLEY:** Right -- no, 1b.

18 **DR. ROESSLER:** 1c.

19 **DR. MAKHIJANI:** 1c.

20 **DR. ROESSLER:** It's right under --

21 **MR. PRESLEY:** I'm sorry.

22 **DR. MAKHIJANI:** Yeah.

23 **MR. PRESLEY:** Yeah, yeah, I'm sorry, it is 1c.
24 Do you mean there that -- that the first day
25 you would do dose reconstructions on something

1 by the hour and then by the day thereafter?

2 **DR. MAKHIJANI:** Well, if there were people who
3 went in on the same day or in -- after one or
4 two days you would have to do that because as
5 you see from -- even from the table that's
6 published up above, Table 1, neptunium half-
7 life, 2.36 days; sodium-24, 15 hours -- so for
8 very early re-entry workers you do have to know
9 the time. I think it -- it will make a pretty
10 big difference.

11 **MR. PRESLEY:** Okay. It's just that I don't
12 know how you're going to say that -- you know,
13 if they start at 6:00 o'clock in the morning,
14 if they went in at 7:00 o'clock or whether they
15 went in at 9:00 o'clock, I don't think the
16 records out there are going to be anywhere near
17 that good.

18 **MR. HINNEFELD:** Well, Bob, I'd just offer -- in
19 a situation like that, we -- we had to do that.

20 **MR. PRESLEY:** Okay. All right.

21 **MR. HINNEFELD:** If we had -- if we had to do
22 that, we would probably take a maximum level on
23 that first day. You know, when -- when did
24 they --

25 **MR. PRESLEY:** Okay.

1 **MR. HINNEFELD:** -- enter, what was the earliest
2 entry, and then we would probably not decay it
3 over the course of that day.

4 **MR. PRESLEY:** All right.

5 **MR. HINNEFELD:** I mean just as a practical
6 matter of the dose reconstruction --

7 **MR. PRESLEY:** Okay.

8 **MR. HINNEFELD:** -- we'd take the highest level
9 and that would be the first day, and then we
10 would work -- worry day by day thereafter if we
11 had to do that. But that's pretty tedious for
12 a dose reconstruction. We would try -- we
13 would try to come up with a bounding approach
14 that would essentially bound the person's
15 intake from his entry, rather than try to do an
16 hour by hour evaluation.

17 **MR. PRESLEY:** That's great. Thank you.

18 **DR. MAKHIJANI:** And we would agree with that.
19 When you're trying to do an accurate job, it
20 would be impossible. But in the context of a
21 compensation program I think you can come up
22 with something.

23 **MR. PRESLEY:** All right. Does anybody have any
24 other -- other comments about comment 1?

25 **DR. MAKHIJANI:** The only other thing I'd like

1 to note is in 1b where that table is being
2 removed, there are some issues that'll be
3 covered under environmental dose, so that's
4 part of the reason it's okay to remove that,
5 and then pick up whatever part of that
6 discussion is under -- under the resuspension
7 question.

8 **MR. PRESLEY:** 1b then we want to note that we
9 do have some comments coming on that.

10 **DR. MAURO:** Could I bring in a -- I guess a
11 different facet of this discussion in light of
12 the SEC. In effect what I'm hearing is we're
13 really talking about the -- the period that's
14 currently covered by the SEC, that is the --
15 this would be aboveground testing. It would be
16 during the time period of '51 to '62, and the
17 concern, I presume -- please correct me if I'm
18 incorrect -- it would be that there were some
19 folks who were asked to go forward shortly
20 after the test, maybe within a matter of hours
21 to days.

22 Now as I understand it, what we're really
23 saying here is -- I guess a couple of things.
24 One -- well, first of all, by and large, for
25 most cancers we're not going to be confronted

1 with that issue because most cancers will be
2 compensated, but we will be confronted with it
3 for cancer such as prostate and skin cancer. I
4 guess my question is to what -- in fact, this
5 struck me as -- as the conversation started.
6 To what extent are we going to engage that
7 question as part of the site profile? Because
8 I believe a lot of the responses that came back
9 here had this -- well, really we feel that this
10 is -- yes, we understand the issue, but we
11 don't really need to engage the issue because
12 of the pending SEC. But then I see that the
13 responses in the summary are silent on well,
14 what about the cancers that are not covered
15 under the SEC. To what extent do we want to
16 engage that issue as part of this working
17 group, or is this something that's more
18 appropriate -- I mean I guess it is part of a
19 dose reconstruction. It's not part of the SEC,
20 so it does really fall within our area of
21 responsibility, and I don't think we've really
22 engaged that.

23 **MR. HINNEFELD:** Well, I can speak to the issue.
24 In fact, I -- I spoke to the Board about this
25 issue at the last meeting. Our approach has

1 been that a finding of infeasibility, like the
2 infeasible -- the infeasible part of the dose
3 at Nevada Test Site before '63 was internal
4 dose.

5 **DR. MAURO:** Yes.

6 **MR. HINNEFELD:** It's not feasible to
7 reconstruct. And since it's not feasible to
8 reconstruct the internal dose, we don't think
9 it's feasible to reconstruct it for any organ
10 and so the prostate cancers or other non-
11 specified cancers we say -- we just write what
12 we call a partial dose reconstruction and say
13 that we have reconstructed what we can
14 reconstruct, and this is all we can do. And
15 then that's what we send to the claimant, and
16 if it's -- it doesn't reach 50 percent, it
17 doesn't reach 50 percent and the person doesn't
18 have the compensation remedy.

19 **DR. MAURO:** But then let's say we move on to
20 the other cancers, we'll talk -- let's talk --
21 talk skin, which will be external, and
22 internal, which will be prostate, two different
23 examples, where the reconstruction of the
24 external dose plays on both.

25 **MR. HINNEFELD:** Yes.

1 **DR. MAURO:** And -- and how we would deal with
2 such issues as the early mix of radionuclides,
3 the resuspension, the direct fallout -- I mean
4 -- in other words, I think that the current
5 version of the TBD -- and please correct me if
6 I'm wrong, I did read it again, you know, in
7 preparation for this meeting, but -- is silent
8 on how we're going to recon-- can we or how are
9 we going to reconstruct a dose to the skin and
10 the prostate gland during the -- the SEC
11 period.

12 **MR. HINNEFELD:** That's correct. It is silent
13 on that.

14 **DR. MAURO:** That -- now it is silent on that.

15 **MR. HINNEFELD:** It is silent on that point.

16 **DR. MAURO:** Okay. And is that a matter that we
17 need to embrace as part of this working group?

18 **MS. MUNN:** I'd really like to see us put that
19 to bed once and for all, because it's going to
20 come up in every single SEC petition that we
21 have. And I -- I have mixed emotions on it
22 when I think about it, personally, and I -- I
23 don't think the Board has been clear as to how
24 they view it. I'm not even sure that folks who
25 aren't on a working group looking at one of

1 these SECs has recognized that this -- it
2 bothers me to say we're not going to look at
3 this now because it's not an SEC issue. Well,
4 if it's still an issue, then when do we look at
5 it and how do we address it?

6 **DR. MAURO:** Is this a site profile issue.

7 **MS. MUNN:** Yeah, is this a site profile issue.

8 **MR. HINNEFELD:** Well, to the extent that this
9 issue relates to the external dose
10 reconstruction, if this is necessary for
11 external dose reconstruction, then we need a
12 resolution of it.

13 **MS. MUNN:** Yeah.

14 **MR. HINNEFELD:** Okay. This kind of -- it's
15 kind of couched, though -- I mean the -- the
16 radionuclide inventory and depend -- if it
17 depends on the monitoring regime and there are
18 other external dose issues that we're going to
19 later on, but the -- the radionuclide mixture
20 is normally conceived of as an internal dose
21 issue because you don't know what the person
22 ingested or swallowed if you don't know their
23 radionuclide inventory, whereas if the person
24 was monitored --

25 **DR. MAURO:** Yes.

1 **MR. HINNEFELD:** -- and you know, if they were
2 with a badge and putting aside all the
3 shortcomings of badge monitoring, but they were
4 monitored for external exposure, which everyone
5 was after about 1957 --

6 **DR. MAURO:** Okay.

7 **MR. HINNEFELD:** -- then you have an exposure
8 record for external exposure.

9 **DR. MAURO:** Okay.

10 **MR. HINNEFELD:** So the way it's couched, it's
11 kind of -- it's brought up as an internal dose
12 -- you know, it's -- it's dismissed as an in--
13 as an issue from an internal dose component
14 standpoint. To the extent that it relates --
15 if it relates -- to the external dose to these
16 people, then we would have to resolve it and --
17 and we would try to -- certainly try to arrive
18 at a technique to do external dose
19 reconstruction for those people because, you
20 know, if you can't do internal and external's
21 all you've got left, and you can't do that
22 either, you've left another -- another
23 population of people out of potential
24 compensation.

25 **DR. MAURO:** And I guess that goes toward my

1 question. Right now do we -- do you feel that
2 we have a site profile that provides the
3 guidance to the dose reconstructor to deal with
4 just that issue, the external dose early years,
5 skin -- well, the external dose?

6 **MR. HINNEFELD:** Well, absent issues we're going
7 to talk about today --

8 **DR. MAURO:** Yes.

9 **MR. HINNEFELD:** -- I certainly think we do from
10 the monitoring period forward. Now if you get
11 back before the time when everybody was
12 monitored, I don't know specifically if I can
13 say that. I'm not familiar enough with either
14 NTS or the site profile, to be completely
15 frank, so I don't really know today. But it
16 certainly has to be part of what we resolve as
17 we move forward, is do we have a technique for
18 external dose reconstruction throughout the
19 period, or if -- you know, and try to arrive at
20 one. I mean realistically, we should really be
21 working very hard to try to arrive at one in
22 this pre-'63 period because we -- we do --
23 there's no advantage to anyone by saying well,
24 it's not feasible to reconstruct external dose
25 before '63. That's no advantage to anyone

1 except we do less work.

2 **DR. WADE:** I mean let's have a generic
3 procedural discussion on Wanda's point because
4 I think it's a terribly important point. NIOSH
5 presents a site profile to be reviewed by the
6 Board. The Board normally spends a great deal
7 of time saying we disagree with that provision
8 and we disagree with that provision, we
9 disagree with that provision -- we spend all
10 our time. It's also very legitimate for the
11 Board to say, as part of its review, we don't
12 think the site profile is complete enough to
13 allow for external dose reconstructions for
14 people with non-presumptive cancers. I think
15 that's a perfectly reasonable comment for the
16 Board to raise and -- and should raise such --
17 such questions. And then SC&A, as the Board's
18 contractor, can also raise such questions, but
19 it would be in the context of saying the site
20 profile is not complete enough to do all that
21 we think it needs to do. And I think those
22 questions need to be raised.

23 **DR. MAKHIJANI:** In this -- in this specific
24 instance, I really agree with Stu's construct -
25 - just for this instance, not the generic

1 problem -- that there are monitoring data from
2 I think April '57.

3 **MR. HINNEFELD:** I don't know, I don't...

4 **DR. MAKHIJANI:** And so for that, leaving aside
5 the question of the adequacy of the film badge
6 record, since there was universal monitoring,
7 it should -- in principle -- be okay. And I
8 think the main unresolved question will be then
9 can you construct a coworker model up to the
10 time of universal badging that's adequate, do
11 you have enough there -- because there was
12 external monitoring before that period. And so
13 I think -- I think for the -- for the SEC-
14 covered workers, that would be the main
15 technical outstanding issue, just in regard to
16 the completeness of the badge.

17 **DR. WADE:** And again, it's just not the
18 accuracy of what's in the site profile, it's is
19 the site profile sufficiently broad to do
20 what's -- what it's intended to do. I think
21 the Board can comment upon that as it likes.
22 Working group as well.

23 **DR. ROESSLER:** I have one additional comment on
24 what John brought up, and that's -- the wording
25 in here that says (reading) because of the

1 pending SEC petition.

2 When I first read that, that was confusing to
3 me because I didn't know -- did that mean the
4 '51 to '62, which apparently still is pending,
5 the Board approved it; or did it mean a
6 potential petition beyond that time? I think
7 we need to clarify that it does mean the '51 to
8 '62.

9 **MR. HINNEFELD:** Yeah, it means the one through
10 '62.

11 **DR. ROESSLER:** Yeah.

12 **MR. HINNEFELD:** That was the one that was
13 pending --

14 **DR. ROESSLER:** On first reading it --

15 **MR. HINNEFELD:** -- when the work --

16 **DR. MAURO:** That's how we interpreted it.

17 **DR. ROESSLER:** -- it wasn't clear to me.

18 **MR. PRESLEY:** I don't know whether we're going
19 to -- this is Bob Presley. I don't know
20 whether we're going to be able to get this
21 settled down for all SEC petitions or not,
22 because I think each one of the larger sites
23 especially are going to be different in what
24 they did in the early years. I don't know
25 whether we're going to be able to settle this

1 off as a -- as -- you know, writing a procedure
2 for all the sites or not.

3 **MR. CLAWSON:** I think it'd almost be
4 impossible, to tell you the truth, looking at
5 each one of the sites. They have their --
6 their own unique set of problems in doing that.
7 I think it's something we're going to have to
8 address each time.

9 **DR. WADE:** NIOSH is supposed to address it in
10 making their site profiles adequately broad.
11 The Board can certainly ask questions and
12 critique them.

13 **MR. PRESLEY:** Okay.

14 **DR. MAKHIJANI:** In this specific instance, I
15 think the main site profile issue that would be
16 outstanding would be a coworker model up to the
17 time of universal badging.

18 **MR. HINNEFELD:** Right.

19 **DR. MAKHIJANI:** For external dose.

20 **DR. MAURO:** I would add on, also, the special
21 circumstance of skin dose. Skin dose is a very
22 difficult challenge, even with monitoring --
23 universal monitoring -- there's still going to
24 be difficulty, even though you may have some
25 monitoring, whether or not you could adequately

1 characterize the nature -- the extent of the
2 skin dose during the testing period. That's a
3 challenge and it's a very difficult challenge.

4 **MR. PRESLEY:** Okay. Anybody else have any
5 comments about comment one?

6 (No responses)

7 Ready to go to comment two, Arjun?

8 **EARLY REACTOR TEST RE-ENTRY PERSONNEL**

9 **DR. MAKHIJANI:** Comment two related to the
10 early re-entry workers for reactor test
11 personnel, and reads (reading) TBD does not
12 provide adequate guidance for dose estimation
13 to gonads, skin, and gastrointestinal tract for
14 early reactor test re-entry personnel. Large
15 hot-particle doses to skin and GI tract have
16 not been evaluated. Naval Radiological Defense
17 Laboratory (NRDL) documents and models have not
18 been evaluated, though one document is
19 referenced.

20 And this is comment two, and NIOSH broke it
21 down into six different comments. Overall, we
22 agree with NIOSH's response. Basically NIOSH
23 agreed to look at the NRDL archive and to look
24 at large hot-particle doses and modify the TBD.
25 This is -- this is not covered by the SEC.

1 This is a completely separate issue involving -
2 - as I understand it; there may be some overlap
3 personnel, but it's a completely separate issue
4 and -- so basically we agree.

5 There are a couple of areas that I'd like to
6 flag. There is -- NIOSH raises the question of
7 the sparseness of fecal data, and this -- this
8 could be an issue in -- in how the
9 gastrointestinal tract dose estimations are
10 going to be made because it's a very unusual
11 type of problem in that you have a surficial
12 high dose, but only to a very limited area.
13 And so there's some kind of concern, reading
14 NIOSH's response, as to how -- how these
15 shallow doses that don't go very deep but --
16 but -- internal shallow doses to the GI tract,
17 which are very localized, are going to be
18 addressed. We had that concern, especially in
19 regard to comment 2f -- response 2f, in that --
20 NIOSH agrees that additional investigation into
21 the subject of large particle doses --
22 ingestion doses is warranted. But it's not --
23 it's not really clear to me how -- how this is
24 going to be approached, based on the response.
25 **MS. MUNN:** What response number again, please?

1 **DR. MAKHIJANI:** Well, there's -- there's 2d, I
2 think, and 2f especially.

3 **MR. HINNEFELD:** 2d as in dog?

4 **DR. MAKHIJANI:** Yeah, D as in dog. No, not 2 -
5 - not 2d, 2c. I'm sorry. This is the -- in
6 reference to the GI tract doses.

7 **MR. PRESLEY:** On page 5?

8 **DR. MAKHIJANI:** Yeah, page 5 -- the first one
9 is on page 5 and the second one is on -- starts
10 at the bottom of page 6.

11 **MR. HINNEFELD:** Is your concern that if there's
12 -- if the data's not robust enough or too
13 sparse, there may not be any meaningful
14 guidance to develop?

15 **DR. MAKHIJANI:** Yeah, that's part of the
16 concern, and then the other concern about how
17 does this all relate to what you do in IREP. I
18 mean does IREP -- is -- is the risk estimation
19 model at all set up -- set up to handle this
20 kind of input, very large localized doses?

21 **MR. HINNEFELD:** For GI tract we're talking --

22 **DR. MAKHIJANI:** Yes.

23 **MR. HINNEFELD:** -- not skin.

24 **DR. MAKHIJANI:** Yes.

25 **MR. HINNEFELD:** So the GI tract dose would be

1 due to the contents passing through and you
2 have about --

3 **DR. MAKHIJANI:** Yes.

4 **MR. HINNEFELD:** -- two days' worth of exposure,
5 essentially. So I believe IREP and IMBA, in
6 combination, could do this. Liz, am I
7 overlooking some --

8 **MS. BRACKETT:** Well, I don't know about IREP.
9 I mean --

10 **MR. HINNEFELD:** IMBA could -

11 **MS. BRACKETT:** (Inaudible)

12 **DR. MAKHIJANI:** I -- I can't --

13 **MR. HINNEFELD:** Yeah, he can't hear. You need
14 to speak louder, Liz.

15 **MS. MUNN:** He can't hear you at all.

16 **MS. BRACKETT:** Sorry.

17 **MR. HINNEFELD:** That's all right. We'll put
18 the microphone over here.

19 **MS. BRACKETT:** It's pretty loud in my head.

20 **MS. MUNN:** Not loud out here.

21 **MS. BRACKETT:** I said I don't know what IREP
22 does. I don't know what -- how that would --

23 **MR. HINNEFELD:** I don't know the issue with
24 IREP, though. What would be the -- what would
25 be the issue with IREP?

1 **DR. MAKHIJANI:** One -- one suggestion might be
2 to ask the NIOSH consultant, Owen Hoffman, who
3 -- and his team, that's very familiar with
4 this, to -- because I -- I don't know whether
5 there's an issue with IREP. It's just a
6 question in my mind as to whether IREP can
7 handle this kind of input.

8 **MR. HINNEFELD:** Well, there's a -- there's a GI
9 tract model. I mean -- or -- or at least one
10 that models the GI tract -- I mean the dose
11 risk model -- in IREP, and theoretically we
12 would be able to arrive at a dose to the GI
13 tract if we had -- you know, the whole issue
14 here is can you get the -- the intake or some
15 other method for determining essentially what
16 was the activity residence time in the GI tract
17 from -- and then the dose will fall out of that
18 directly, and IMBA would take care of that.
19 And so I -- I just don't -- I don't see the
20 technical -- technical issue here.

21 **DR. MAKHIJANI:** Okay.

22 **MR. HINNEFELD:** I must be overlooking something
23 'cause I don't see the technical issue.

24 **DR. MAURO:** I -- I'm -- I guess I looked at it
25 as a different -- had to do with the fact that

1 you're going to -- whether the particle's
2 deposited on the skin, the beta emitter is on
3 the skin, or it's swallowed, which can still be
4 a fairly insoluble particle, it's not as --
5 it's not as if you're going to be develo--
6 delivering a uniform dose to the GI tract --

7 **MR. HINNEFELD:** Gotcha.

8 **DR. MAURO:** -- or to the skin. You're going to
9 be delivering -- and I wasn't aware of this
10 until I guess you prepared it, this idea of
11 what -- the Krebs dose, which is this particle
12 sits on the skin or in the GI tract and
13 delivers this very high localized dose where it
14 sort of sits, on the order of 1,500 rads, which
15 is, you know, lethal to the cells. I don't
16 know whether this creates something new.

17 **MR. HINNEFELD:** Okay. Okay, as far as the
18 issue, then, of that -- that specific issue,
19 we're aware of that and it'll be part of what
20 we have to deal with -- in fact it's mentioned,
21 you know, specifically in -- in the report.
22 And there is a body of literature out there
23 about, you know, hot particle dose and impact
24 on the cells. You know, certain cells are --
25 are -- it's fatal to certain cells so those

1 don't become cancer and so it's -- it's
2 perturbed in that fashion. There is a body of
3 literature out there. But you're right in that
4 that will have to be an issue that's -- that's
5 addressed and if -- if not on this specific
6 finding, it occurs elsewhere I know for sure.

7 **DR. MAURO:** But that would be outside of, right
8 now, the way IMBA deals with -- it doesn't --
9 doesn't come to grips with that type of
10 exposure setting.

11 **MR. HINNEFELD:** IMBA does not -- as far as I
12 know, right now -- well, IMBA would probably
13 give average dose over the organ.

14 **MS. BRACKETT:** Right, it wouldn't calculate to
15 --

16 **MR. HINNEFELD:** It wouldn't -- it wouldn't
17 calculate to a particular.

18 **DR. MAURO:** And -- and whether or not that's --
19 I know where it goes down -- the lung, for
20 example -- the hot particle issue has been put
21 to bed. This is the first time I guess I've
22 seen it come up in the context of the GI tract
23 or skin, and how do you -- how do you deal with
24 whether or not that poses a different kind of
25 risk.

1 **MR. HINNEFELD:** Well, certainly it'll come up
2 in the skin does discussion and during that
3 portion, you know, we tried to deal with it
4 there. I guess by extension we'd have to worry
5 about is there -- is the same effect -- occur
6 in the GI tract as well. So it is an issue
7 that will have to be addressed in -- in the --
8 the continuing work we're going to be doing.

9 **DR. ROESSLER:** Isn't that -- when you look at
10 the dose and you assume it's distributed evenly
11 over the tissue, isn't that risk higher than if
12 you assume it's --

13 **DR. MAURO:** That's without -- with the lung, so
14 it may turn out to be the same thing here.

15 **DR. ROESSLER:** So if -- that would be an
16 overestimate, it would seem like.

17 **DR. MAURO:** Uh-huh.

18 **MS. BRACKETT:** But because -- and also in the
19 GI tract it could be -- it could have a lot of
20 shielding around it. It would be part of the
21 contents, so it would be overestimating from
22 that standpoint also.

23 **DR. MAURO:** Uh-huh.

24 **DR. ROESSLER:** From -- for the somatic effects.

25 **MS. BRACKETT:** Yeah.

1 **DR. MAKHIJANI:** Just from -- from -- from the
2 way I read the NIOSH response, we're -- we're
3 in basic -- I think we're in basic agreement
4 that -- that some technical work here -- it's
5 what -- my comment was simply flagging a little
6 detail on a couple of items where, you know, it
7 -- it looked to us that significant amount of
8 work, or there may be a data deficiency in
9 regard to fecal monitoring, and I just wanted
10 to flag that. But basically we're in agreement
11 with NIOSH's response.

12 **MR. PRESLEY:** So there's really no -- no
13 problem with 2c then. Is that correct?

14 **DR. MAKHIJANI:** Well, there's no problem --
15 there's no problem in NIOSH's response. It's
16 just -- I'm just flagging it in the sense that
17 -- as distinct from item -- comment one where --
18 -- well, I think it's a very straightforward
19 job. We basically agree. NIOSH has flagged
20 the character of its response and it should be
21 very straightforward to do it. I just wanted
22 to call your attention to the fact that there
23 are some sufficiency of data issues and some
24 modeling issues, IREP issues -- I mean this is
25 much more complex than -- to resolve than

1 comment one. But yeah, no, we have no issue
2 with NIOSH's response as such.

3 **MS. MUNN:** So I want to be clear. With respect
4 to our hot-particle theory, the process that's
5 currently used for dose reconstruction is such
6 that the hot-particle theory does not create an
7 additional dose over and above what we
8 currently do with IMBA. Right?

9 **MR. HINNEFELD:** Well, currently --

10 **MS. MUNN:** Didn't -- didn't we -- didn't --

11 **DR. ROESSLER:** Maybe "dose" isn't the right
12 word. It's more like overall effect or risk.

13 **MR. HINNEFELD:** The overall risk, and that was
14 evaluated with respect to somewhere, if not
15 necessarily GI tract. You know, would it be
16 different -- GI tract -- it require I think a
17 little bit of a literature search on our part
18 in terms of the information that was available
19 from the -- the hot-particle controversy from
20 20 years ago.

21 **MS. MUNN:** Yeah, I just don't want this hot-
22 particle theory business to be coming up again
23 and again if we can identify this is the way we
24 address it and it is claimant friendly, as a
25 generic response, then that would put this to

1 bed. Not just for this issue, but again and
2 again.

3 **DR. ROESSLER:** Not just for this site, but --

4 **MS. MUNN:** Exactly.

5 **MR. PRESLEY:** Yeah, all --

6 **DR. ROESSLER:** -- across the --

7 **MR. PRESLEY:** -- all the other sites, too --

8 **DR. ROESSLER:** That's a big --

9 **MR. PRESLEY:** -- 'cause you're going to have
10 that.

11 **DR. ROESSLER:** That's a big point that would be
12 addressed, I think, for everything.

13 **MS. MUNN:** This comes in the same category, in
14 my mind, as the -- the heavy breathing issue.

15 **MR. HINNEFELD:** Uh-huh.

16 **MS. MUNN:** You know, if -- if we can't make a
17 generic statement as to how we're going to deal
18 with that and ac-- the Board accept that, then
19 we have to keep reinventing this wheel every
20 time we go to a new site --

21 **MR. HINNEFELD:** Right.

22 **MS. MUNN:** -- and it seems much more fruitful
23 for us to come to a -- an agreement about how
24 it will be addressed, and address it that way.

25 **DR. MAURO:** Could I couch it in a different

1 way? 'Cause I'm -- this has been one of these
2 nagging problems for me. I visualize a worker,
3 claimant, at the Nevada Test Site -- skin
4 cancer, localized skin cancer develops. Okay?
5 And an attempt has to be made to try to
6 reconstruct his dose for compensation purposes
7 because he falls outside of the presumptive
8 range. Okay. Now we have that person.
9 Then we say okay, well, we have a two-step
10 process. One is first, what is the dose that
11 was delivered to his skin. Now when you speak
12 in terms of trying to reconstruct the doses to
13 a person's skin, you always -- you're always
14 confronted with the easy problem and the
15 tougher problem. The easy one is that the
16 external dose from the radioactivity that's on
17 the ground and the beta emission coming from
18 it. There's a way to deal with that. That's
19 an easy -- that's the easy one to fix.
20 The tough one is -- has to do with direct
21 depositions from either fallout or resuspension
22 of these particles that we're talking about
23 landing on the skin and delivering one of these
24 localized doses. What I'm troubled with -- if
25 I was -- you know, if someone came to me, said

1 well, how -- how do I know that cancer that I
2 got on the back of my hand wasn't because I was
3 working in an area and one of these little
4 small particle landed on my skin and delivered
5 this high localized dose. I have to say I find
6 that an intractable problem. I wouldn't know
7 whether or not we could do that. I mean if
8 someone were to ask me that, how would I come
9 to grips with that.

10 I could certainly tell you whether or not --
11 what your dose would be, let's say to your skin
12 throughout your whole body, or from the -- from
13 the feet up, 'cause it gets lower as you go
14 higher 'cause a person's standing up on top of
15 this field. But from the direct deposition
16 problem, I say I don't know whether I could
17 help this guy. And so I guess I'd like -- put
18 that on the table. This is a nasty problem be-
19 - for the two reasons. One is -- one is, how
20 do you predict what the dose is. And then
21 second is, once you know the dose, it goes back
22 to the lung issue. Given that yes, 1,500 rads
23 were delivered in some kind of comp-- localized
24 -- you know, there's a -- there's the -- the
25 dead skin, then it gets lower as you get a

1 millimeter or so away. The -- I guess the
2 radiobiology of that -- radiocarcinogenicity of
3 that, I'm -- I'm not sure if there's literature
4 on that or not. So we've got two parts of it
5 and I don't think IREP come -- you know,
6 engages that issue. I'm not sure.

7 **MR. HINNEFELD:** IREP does average dose over the
8 organ.

9 **DR. MAURO:** Average dose over the -- now that
10 turn -- may turn out to be sufficient, the way
11 it was demonstrated to be sufficient in the
12 cases of law, and that may be the answer to the
13 second half of this problem. But the first
14 half of the problem is a nasty one, you know,
15 because it's almost a stochastic process --

16 **MS. MUNN:** Well, it is.

17 **DR. MAURO:** -- where the particle -- you know.

18 **MS. MUNN:** It is, and -- and the resuspension
19 issue is always a question of what's
20 resuspended and what's in it, and the other
21 issue is how long does it stay on the skin.
22 Now how long did this guy go before he washed
23 his hands, for goodness sake, and that's a --
24 I'm -- I'm not sure that one could ever be that
25 specific, but you can certainly make some

1 reasonable assertions in that regard. And I
2 don't know how many cases -- I guess that's --
3 that's the other question, and how many cases
4 are we talking about here where that might even
5 be an issue? It would be a shame if we got
6 into a situation where we were spending three
7 weeks of somebody's time working on an issue
8 that affected two claimants. That's not to in
9 any way disparage the effect with respect to
10 the two claimants, but in practical terms, you
11 have to decide whether these issues that we're
12 talking about are purely theoretical issues or
13 are these real issues.

14 **MR. HINNEFELD:** Well, in terms of the number of
15 claimants, it's probably worth it to do the
16 effort for the number of claims. There -- I
17 only know this because we just ran the report.
18 There are roughly 135 non-presumptive cancers
19 from Nevada Test Site and PPG in their class --

20 **MS. MUNN:** Uh-huh.

21 **MR. HINNEFELD:** -- in those cla-- designated
22 classes, and so of those -- you know, the
23 majority of those non-presumptives are going to
24 be skin cancers, probably the majority.
25 There'll be a lot of prostates in there, too.

1 Prostate and skin will account for the vast --
2 the vast -- overwhelming majority , so there
3 are -- so it's probably enough cases that it's
4 worth the effort to try to determine what --
5 what should be done in these cases and --

6 **MS. MUNN:** Certainly --

7 **MR. HINNEFELD:** -- what the right answer is.

8 **MS. MUNN:** Certainly on this site.

9 **MR. HINNEFELD:** And that's strictly -- and I'm
10 just talking about the number of cases at
11 Nevada Test Site.

12 **MS. MUNN:** Right. Right, that's just there.

13 **MR. HINNEFELD:** And this -- this issue's going
14 to be addressed in several other sites as well.

15 **MS. MUNN:** Yeah, it would be.

16 **MR. PRESLEY:** Okay.

17 **DR. ANIGSTEIN:** This is Bob Anigstein. I'd
18 like to make an observation on John Mauro's
19 question. I -- I didn't quite hear the last
20 response, so forgive me if I'm duplicating
21 something that was said. It seems to me the
22 issue is tractable -- I don't know if the data
23 exists -- and that would be to find out what
24 are the statistics on hot particles in a
25 comparable situation and then they could plot a

1 probability distribution of any given location
2 on the skin having a hot particle land on it
3 and what are the probability that that
4 particular cancer site did receive a hot
5 particle. And then from there, true, the very,
6 very near cells actually are spared becoming
7 cancerous 'cause they're killed. But then
8 there must be a halo around that area where the
9 dose falls off, whether it's gamma or -- or
10 beta, I think the -- the range that is not
11 exact, they're straggling. So there would be a
12 region where there would be intermediate doses
13 that are not lethal but that would be
14 carcinogenic.

15 **DR. MAKHIJANI:** The Naval Radiological Defense
16 Lab actually has some statistical analysis of
17 this hot particle problem, and since NIOSH has
18 said they're going to look at that ar-- I mean
19 there's a big archive there. I only looked in
20 detail at one report and -- just for the
21 purpose of the review, but I think since NIOSH
22 is going to look at that archive, you'll --
23 you'll just come up with all of this stuff.
24 They -- they do have some statistical analysis
25 there.

1 **MS. MUNN:** And your mention of the -- of the
2 Naval Radiological Defense Lab information
3 brings another issue to mind. Twice in the
4 SC&A comments there was a reference to that
5 particular body of literature and the assertion
6 that it should be further analyzed. And since
7 I'm not familiar with the -- the documents, it
8 raised the question, to me, analyzed for what?
9 Certainly the accuracy of the data is not what
10 you're being requested, is it? Is -- what --
11 what -- can you be more specific as to what you
12 meant really when you said analyze that data?

13 **DR. MAKHIJANI:** Well, NRDL actually had
14 measurements of hot particles, number of hot
15 particles, deposition, so you can actually get
16 --

17 **MS. MUNN:** Yeah, I understand that.

18 **DR. MAKHIJANI:** -- information about doses.
19 They also --

20 **MS. MUNN:** I thought you had said --

21 **DR. MAKHIJANI:** -- have analyses about
22 probabilities of -- of deposition and so on, so
23 -- and they have these dose calculations. So I
24 think -- I think that needs to be made part of
25 the -- of the site profile so there's a method

1 to actually calculate these doses. And a lot
2 of that work was done by the NRDL. Now you
3 might not agree with how -- I didn't do an
4 independent evaluation of whether they were
5 right or wrong or whether the statistical
6 analyses was correct, but it seems to me that
7 there's a body of literature there that, if
8 NIOSH on analysis feels is valid, could be just
9 incorporated into the TBD largely as guidance
10 for dose reconstruction.

11 **MS. MUNN:** That really is my question. Are you
12 asking for NIOSH to evaluate the process in
13 that body of literature, or are you just asking
14 that they incorporate it? If I understand what
15 you just said, you're asking that they
16 incorporate it. Is it --

17 **DR. MAKHIJANI:** Well, I think -- I think some -
18 - at least a modest amount of critical
19 evaluation would be necessary before -- you
20 know, this was done a long time ago and we're -
21 - we're operating 50 years from the time these
22 documents were written. And so some -- some
23 evaluation as to compatibility with the
24 existing guidance and the regulations and the
25 models that are being used will be necessary.

1 On -- on reading it I didn't find any -- any
2 flags went up for me that would say I don't
3 think that this can be used or -- it seemed --
4 it seemed that the methods used were sound and
5 can be incorporated. But at least a modest
6 amount of evaluation should be done before
7 incorporating it, I think.

8 **MS. MUNN:** Any problem with that --

9 **MR. HINNEFELD:** I think that's what --

10 **MS. MUNN:** -- Stu? I would expect --

11 **MR. HINNEFELD:** -- we'd do anyway with a body
12 of knowledge like that.

13 **MR. PRESLEY:** Okay. You had a comment on
14 response 2f?

15 **DR. MAKHIJANI:** No, it's not -- I think -- I
16 think Stu addressed it.

17 **MR. PRESLEY:** All right. What about -- let's
18 go back to the top on two. Anybody have
19 anything with A on that? We didn't -- we
20 didn't say anything about 2a. I want to make
21 sure we don't leave anything out.

22 **MS. MUNN:** I think that's sort of covered in
23 the discussion we just had with respect to that
24 data.

25 **MR. PRESLEY:** Okay. And then b and c? B has

1 to do with the large particle ingestion and
2 skin disposition (sic) and that's what we've
3 been discussing. Got no problems? With c we
4 did.

5 **MR. CLAWSON:** But -- help me out here for a
6 minute. Maybe I got a little bit lost in this,
7 but c we were saying that it was okay, but we
8 had some questions on it, so how are we -- how
9 are we going to track that?

10 **MR. PRESLEY:** NIOSH is going to go back and
11 look --

12 **MR. HINNEFELD:** We -- we propose to provide a
13 revision that will resolve this. Now that's
14 what we're saying we will do. And so at that
15 point it'll be a working group or Board
16 question about is the resolution good, is it a
17 valid resolution. You may engage your
18 contractor to assist in that evaluation or
19 whatever.

20 **MR. CLAWSON:** I just kind of got confused
21 between -- dealing with...

22 **DR. MAKHIJANI:** Now I'd really like to say that
23 NIOSH did a wonderful job in preparing a
24 thorough set of responses. It was -- it was
25 really easy to go through, very clear --

1 I believe you probably can access our site
2 research database. There's --

3 **MR. ROLLINS:** Or you can ask me and I'll e-mail
4 it to you.

5 **DR. ROESSLER:** I ask you. I'll give you my
6 address later. Okay?

7 **MR. HINNEFELD:** We can -- I can get your
8 address.

9 **MR. ROLLINS:** That's the easiest way, Gen.
10 I'll just send it to you.

11 **MR. PRESLEY:** Okay, anybody else have any more
12 -- anything on --

13 **MR. HINNEFELD:** Anybody else want it? Any
14 other Board members want it?

15 **MS. MUNN:** How long is it?

16 **MR. ROLLINS:** I'm trying to remember -- it's
17 not that long, and it's got some test cases in
18 the back that work you through the
19 calculations. It'd take you about a day to
20 read it -- and to absorb it. Maybe -- you,
21 maybe half a day.

22 **MS. MUNN:** Yeah, send it to me.

23 **MR. PRESLEY:** Okay, anybody else have anything
24 else on two?

25 (No responses)

1 Let's move on to three, comment three -- Arjun?

2 ATMOSPHERIC TEST PERIOD

3 **DR. MAKHIJANI:** This relates to the same issue
4 as abo-- but for atmospheric -- for testing
5 workers. (Reading) Doses from large non-
6 respirable particles to GI tract and skin for
7 workers in the early atmospheric test period
8 have not been evaluated. Those doses could be
9 high. Hot-particle doses also need to be
10 evaluated for early drillback and other re-
11 entry workers during underground testing
12 periods.

13 And basically the response is split up because
14 of different types of worker. One is that for
15 -- for the atmospheric testing workers, I think
16 the -- part of the issue, at least so -- is
17 resolved because it's covered by the SEC. So
18 far as the external dose is concerned it would
19 seem to be approximately the same as for -- as
20 for the reactor -- reactor test workers, except
21 for reactor test workers there's actually a
22 body of data there that you don't have, so far
23 as I know, a comparable body of data for the
24 external dose for atmospheric testing workers.
25 Am I right about that?

1 **MR. HINNEFELD:** Gene, for the reactor?

2 **DR. MAKHIJANI:** No, you don't -- for the
3 reactor -- for the reactor areas you actually
4 have some empirical data and some measurements
5 that were made by NRDL.

6 **MR. HINNEFELD:** Right.

7 **DR. MAKHIJANI:** But you don't have comparable
8 hot-particle data for --

9 **MR. ROLLINS:** No, not -- not to my knowledge.

10 **DR. MAKHIJANI:** To my -- yeah.

11 **MR. ROLLINS:** There's a -- there's a lot of
12 data out there and I'm not saying it doesn't
13 exist, but I haven't seen it yet -- nothing to
14 the degree that they did for the reactor test.

15 **DR. MAKHIJANI:** Okay, so -- the -- this is kind
16 of a complication of the external dose
17 calculation, but basically we agree with the
18 NIOSH response that it's largely covered by the
19 SEC issue, and to the extent that you can
20 extend your external dose calculation to cover
21 it, it would be good.

22 NIOSH also agreed that in regard to accidental
23 venting they're going to evaluate the hot-
24 particle question. And accidental venting did
25 occur up to 1970 December, significant ones,

1 which the last one was the Baneberry test.
2 And the last one is in regard to tunnel re-
3 entry workers, and NIOSH is going to look at
4 that issue. And so far as we're concerned --
5 let me look at my comment here -- this -- yeah,
6 basically the main issue for the non-SEC
7 workers will be the ventings and the early
8 drillback re-entry, and NIOSH has agreed to
9 revise the TBD. So until then, we're kind of
10 in agreement with the NIOSH comment.

11 **MR. PRESLEY:** Talking about early drillback, to
12 my knowledge drillback didn't start till we
13 started the underground testing.

14 **DR. MAKHIJANI:** Right.

15 **MR. PRESLEY:** Okay.

16 **DR. MAKHIJANI:** And I -- I do not know the
17 extent to which this might affect those
18 workers. I think that would presumably be the
19 first step in evaluating whether this is an
20 issue that materially affects that set of
21 workers or not.

22 **MR. PRESLEY:** I've seen the drillback
23 operations. I have a DVD with me that shows
24 one of the drillback operations and how it was
25 done. They were very, very careful when they

1 did bring the samples to the surface in the way
2 that they handled them and monitored, and I
3 would presume it was done in the early days
4 just like it was in the later years 'cause they
5 did have the equipment when they started doing
6 that. Yeah, that stuff when it came out was
7 hot, handling it long distance and immediately
8 put into (inaudible) and things of this nature
9 and a monitor. I'd say you all ought to have
10 all -- there ought to be all kinds of
11 monitoring data.

12 **MR. HINNEFELD:** Chances are there's quite a bit
13 of record about that. There is a --

14 **MR. PRESLEY:** If you can find it. That's the
15 only problem. I know there was people there
16 doing the monitoring every time I was there.

17 **DR. MAKHIJANI:** And they had -- at least at a
18 certain period they had protective equipment
19 and --

20 **MR. PRESLEY:** Oh, yeah.

21 **DR. MAKHIJANI:** -- air -- air line, so -- so
22 it's just a --

23 **MR. ROLLINS:** But during the early drillbacks
24 they didn't have blowback preventers.

25 **MR. PRESLEY:** No -- no, they didn't. Now that

1 four?

2 **ORONASAL BREATHING**

3 **DR. MAKHIJANI:** (Reading) Ingestion of non-
4 respirable hot particles by reactor testing and
5 nuclear weapons testing workers due to oro-
6 nasal breathing needs to be evaluated.

7 And it's a little bit different than the oro-
8 nasal breathing issue that we raised before in
9 that it's sort of direct ingestion of large
10 particles, not ingestion via the respiratory
11 route. And NIOSH has agreed to evaluate that
12 and warrants further consideration. So we
13 would just await that response.

14 **MR. PRESLEY:** So that -- that will be
15 forthcoming down the road.

16 **MR. HINNEFELD:** Right.

17 **DR. MAKHIJANI:** I have a question. Are you
18 going to cover this -- sort of meld this
19 together with a module oro-nasal response? It
20 seems to be somewhat of a distinct --
21 particular issue. Are you going to do a
22 special thing on this?

23 **MR. HINNEFELD:** The difference here being hot
24 particles present in the non-respirable portion
25 of the airborne.

1 **DR. MAKHIJANI:** Right.

2 **MR. HINNEFELD:** So that essentially an average
3 concentration measurement then would not
4 adequately represent if there were hot
5 particles present.

6 **DR. MAKHIJANI:** No.

7 **MR. HINNEFELD:** Well, I would suggest it could
8 be -- we'd have to have it consistent with
9 whatever the oro-nasal solution is, but you're
10 right, it would be a bit of a special case when
11 there's a potential for hot particles, which
12 would then not be -- you know, they would not
13 be adequately represented by the average
14 airborne concentration. That's the problem.

15 **MS. MUNN:** It would not, no.

16 **MR. HINNEFELD:** So that -- that would have to
17 be something of a special case and so there
18 would probably have to be an addendum of some
19 sort to the oro-nasal solution.

20 **MR. ROLLINS:** That would work back to the
21 probability -- sort of NRDL sort of thing.

22 **MR. HINNEFELD:** Right, probably in that sense.

23 **MS. BRACKETT:** How does this differ from number
24 two? I mean this is --

25 **MR. PRESLEY:** That's what I'm wondering.

1 **MS. BRACKETT:** -- get into the GI tract?

2 **DR. MAKHIJANI:** Well, it's how the -- how many
3 -- it's simply how many particles -- the route
4 of getting into the GI tract. Number two is
5 sort of the broader issue for reactor workers
6 only in regard to evaluation of the doses, and
7 this just raises -- two, three and four are
8 really elaboration of the same issue, just --
9 they could have been 2a, b and c, it just was
10 written up that way.

11 **MR. PRESLEY:** I was going to say, this -- that
12 report ought to be -- I think it probably ought
13 to roll comment two all the way through four as
14 --

15 **DR. MAKHIJANI:** Yes.

16 **MR. PRESLEY:** -- one comment.

17 **DR. MAKHIJANI:** Right.

18 **MR. PRESLEY:** Okay.

19 **DR. MAURO:** Regarding the oro-nasal breathing,
20 I -- it's been a while when it came up and we
21 discussed it at Bethlehem Steel, and -- and I -
22 - as I recall, I felt as if it was -- we're
23 still a little bit in a fuzzy area about the --
24 the degree of agreement on that issue. As I
25 understood it, ICRP has a standard model where

1 -- regarding how people breathe. The idea,
2 though, that was brought up -- and I -- and I
3 think it's a legitimate question -- is
4 apparently there's a significant fraction of the
5 general public that breathes entirely through
6 their mouth. Okay? And -- and please correct
7 me again if I'm wrong, but I thought the issue
8 had to do with when you're doing dose
9 calculations for people that are inhaling
10 radioactivity, do we simply adopt the default
11 ICRP methodology on -- on the kinetics and
12 behavior of particles and the breathing
13 patterns of typical people, or do we take into
14 consideration -- and the number I recall is
15 something like 20 percent of the population
16 actually breathe entirely through their mouth
17 all the time, not just when they move into
18 heavy lifting. And ag-- so -- and as I recall,
19 there was still a -- almost a policy question
20 that was at play here.

21 Since the rules say use ICRP, in effect when we
22 raised the issue -- hold the presses. There
23 are a lot of people that breathe only through
24 their mouth and that's going to change things,
25 and I think it had a factor of two to five-fold

1 effect. I think that's the number -- depending
2 on the particle size.

3 **MS. MUNN:** It was larger, though.

4 **DR. MAURO:** Yeah, it was -- it was relatively
5 sm-- now --

6 **MS. MUNN:** Significantly.

7 **DR. MAURO:** -- are we back to that -- I mean
8 are we still engaged in that and has that
9 become subsumed and are we going to try to --
10 in other words, okay, we have that. Now we're
11 going to fold into that the fact that now we're
12 dealing with these large particles that will be
13 coming in, and instead of coming in through the
14 nose and behaving the way they behave, they'll
15 be coming in through the mouth and behave the
16 way they're going to behave, which changes the
17 kinetics, I presume, and where they're going to
18 be deposited and what the potential risks are.
19 So I -- I guess I -- I'm putting something out
20 -- rather than sort of like avoid it, not go
21 back there again, I'd like to get everyone's
22 sense about where we are and do we still have
23 before us this matter -- are we going to
24 deviate from the standard ICRP methodology for
25 the way people breathe and explicitly take into

1 consideration the fact that some percentage of
2 the American people breathe entirely through
3 their mouth, or is that off the table?

4 **MS. MUNN:** That's exactly the issue that I was
5 trying to raise earlier when I mentioned it. I
6 -- I have the same questions, and I would like
7 to see us put it to bed, as a policy matter,
8 once and for all. Unless one of the working
9 groups, in accordance -- in agreement with
10 NIOSH and with SC&A can bring such a
11 recommendation to the Board, we're going to
12 have to deal with this every time we come into
13 a situation where airborne or resuspension is a
14 significant factor in dose calculations.

15 **DR. MAURO:** And this may be especially relevant
16 here because we are dealing with a situation --
17 we're not just dealing with five micron AMADs
18 and how they behave. Now we're dealing with
19 the possibility that we have lar-- relatively
20 large particles and -- and so it sort of gets
21 confounded. And so until we put the first
22 issue to bed, we really don't have anything to
23 stand on. You see what I'm saying?

24 **MS. MUNN:** I agree. And in NTS, and I'm sure
25 the same is true in Pacific Proving Grounds,

1 other cases of that sort particularly, you have
2 this double whammy that if -- if we keep
3 beating this issue to death without identifying
4 exactly how we're going to approach it, then I
5 don't see how NIOSH can approach it in the
6 absence of a real decision on the part of the
7 Board because it is an unusual circumstance and
8 we -- we probably all have different view of
9 it. My personal view is to accept the ICRP
10 data as being the standard from which we
11 operate, but when we have special situations
12 like this, an addendum of some sort is
13 necessary to say in these cases we will do
14 something slightly different. But in terms of
15 trying to identify how many people are mouth
16 breathers and how many aren't, I don't know how
17 we can possibly do that with -- with this
18 population that we have.

19 **MR. PRESLEY:** This is Bob Presley. I thought
20 we put that to bed at the last meeting and --
21 and we said we would go with ICRP except on
22 special occasions then that -- that NIOSH would
23 go in and -- and take a look on a -- you know,
24 a case by case basis. I thought that's what we
25 decided to do.

1 **MS. MUNN:** On a site by site basis rather --
2 yeah.

3 **MR. HINNEFELD:** I don't -- I don't recall. I
4 don't recall the Board action. I don't -- I
5 don't -- I am not really up to date on the
6 discussions on oro-nasal breathing so I don't
7 recall today.

8 **DR. MAURO:** I'm sort of inclined to re-- I
9 think this was actually during a full Board
10 meeting --

11 **MR. PRESLEY:** Yeah, yeah.

12 **DR. MAURO:** -- and -- and I think that that --
13 but it for some reason is still a little fuzzy
14 and whether or not that's -- okay, that's how
15 it -- policy decision, this is ICRP, we're
16 going that route. Arjun, I know that you're
17 very interested in this, do you have
18 recollection on where we are?

19 **DR. MAKHIJANI:** I have my notes from the
20 Bethlehem Steel -- the discussion where this
21 came up, and I could -- I have to find them. I
22 believe I have -- I have them in my file
23 somewhere here. As I recall, the resolution of
24 the Bethlehem Steel oro-nasal breathing was
25 that basically it wasn't going to be resolved

1 in the context of Bethlehem Steel, but NIOSH
2 was going to prepare a generic assessment. And
3 what I heard Stu say in -- in the present
4 context of Nevada Test Site that you'd put some
5 kind of addendum for the larger non-respirable
6 particles 'cause this issue only came up in the
7 context of respirable particles before and as
8 it affected lung dose. And what we're talking
9 about here are non-respirable particles as it
10 might affect GI tract dose, so it's a little
11 bit of a different question that needs special
12 attention, but -- but I think can be covered in
13 -- in the con-- general context of the same
14 issue of oro-nasal breathing.

15 **DR. MAURO:** It seems to me you have to resolve
16 the oro-na-- I mean if the decision has been
17 made as a poli-- because the science is there.
18 There's no dou-- I don't think there's any
19 disagreement around the table that yes, if you
20 assume a person breathes solely through their
21 mouth, and we all agree that there is some
22 fraction -- I don't know if we'll agree on what
23 that fraction is -- that this is what happens.
24 We all ran the numbers. We know what the doses
25 -- the differences are. They're not large, but

1 they're a factor of two. So it's not that we
2 have a scientific disagreement here. We really
3 have a disagreement on policy. Do we -- do we
4 say well -- do we say now there's enough people
5 out there in terms of percentage of population
6 that breathe through their mouth solely that
7 maybe we should deviate from the standard
8 method and take -- give the benefit of the
9 doubt and assign that to everyone, or no, ICRP
10 is pretty clear. You follow ICRP. If we
11 follow ICRP, it's the standard breathing and I
12 think that we've got to put that to bed. Once
13 that's put to bed, then we can go ahead and
14 move on to this one. We can't move on to this
15 until we put that to bed.

16 **DR. MAKHIJANI:** Here's what the Board and --

17 **DR. ANIGSTEIN:** This is Bob Anigstein. I'd
18 like to make one -- a couple of comments on
19 this. One is -- excuse me if I'm preaching to
20 the choir, but ICRP models, the ICRP dose
21 coefficients, are specifically designed, to my
22 understanding, for regulatory purposes, to
23 allow government -- governmental and other
24 agencies to set dose limits, to set exposure
25 limits to protect the general population. And

1 the usual criterion is it's the dose to -- the
2 average dose to the critical group. And the
3 critical group would, for instance, include
4 mouth breathers and normal nasal breathers on
5 say eight -- eight to ten -- eight to two
6 ratio. So the average dose would not be
7 strongly affected. But if we're dealing with
8 individuals, then the model may not necessarily
9 apply to all individuals and it would seem not
10 unreasonable to make an exception. It's not
11 questioning ICRP. They -- they did it for a
12 different purpose.

13 **DR. MAURO:** Bob, I'd like to add to that. I
14 think when I-- when you look at ICRP, there are
15 lots of compromises. They built a reference
16 man. They have default kinetics for various
17 transfer factors -- and I look to Liz because
18 she probably knows more about this than anyone
19 that I know of -- and there's uncertainty in
20 all these parameters. And there's individual
21 variability in all the parameters that go into
22 the default respiratory tract model that's
23 basically part of the I guess ICRP-68, 66. So
24 the question becomes is this just one more
25 parameter, perhaps a dozen parameters that --

1 that define a reference man and woman, and are
2 we sort of trying to tweak one particular
3 parameter while ignoring all the others? You
4 see -- because -- or is this one that's
5 special?

6 **MS. BRACKETT:** I was going to make that exact
7 point, that nobody -- or very few people are a
8 reference man and that's what we're using to
9 assign all these doses, so that the question
10 then becomes where do we draw the line --

11 **DR. MAURO:** Where do we stop.

12 **MS. BRACKETT:** -- right, where do you stop.

13 **DR. WADE:** One very procedural issue. I've
14 been given a note by some people who are
15 listening on the line and -- and the request is
16 that everyone who can, please mute your -- your
17 phone so that your breathing and the background
18 noise isn't heard by all. Apparently some
19 people are having difficulty listening to us,
20 so anyone who can, please mute, and then unmute
21 when you have a comment to make.

22 And then to the issue of what the Board has
23 decided on oro-nasal breathing, that's
24 something we can research over the lunch hour.
25 I don't have the ability to do that right now -

1 - or Arjun, do you have it?

2 **DR. MAKHIJANI:** I do have my notes from the
3 Bethlehem Steel resolution, and -- according to
4 my notes, anyway -- it says SC&A and NIOSH
5 agree that the effect of oro-nasal breathing
6 would be small for Bethlehem Steel. So we
7 decided to drop the issue in the context of
8 Bethlehem Steel. And NIOSH will develop
9 guidance with regard to this issue. That's how
10 I think it was left by the Board.

11 **DR. WADE:** And Stu, are you -- are you aware of
12 the status of NIOSH's development of --

13 **MR. HINNEFELD:** I am not. I am not in -- have
14 not been involved in that issue and so I don't
15 know the status of it.

16 **DR. WADE:** Maybe we can find that out over
17 lunch and report back to the group.

18 **MR. HINNEFELD:** I could give that a shot.

19 **MS. BRACKETT:** Dave Allen told me that Jim
20 Neton had assigned someone to work on it, but
21 didn't know any of the details.

22 **DR. WADE:** We'll give you a status report after
23 lunch on where that is, and then both Robert
24 and I have captured this as an issue we need to
25 bring to the Board, along with the hot particle

1 issue, to try and get resolved.

2 **MR. PRESLEY:** Okay. We've been going at it
3 about an hour and a half. Does anybody need a
4 break? It's now almost 11:30. Or do you want
5 to continue and let's break at 12:00 or -- you
6 could use a short break? Okay. I've got no
7 problems with it. Ray said he needs a break.
8 Why don't we break for ten minutes and come
9 back at 25 till.

10 (Whereupon, a recess was taken from 11:25 a.m.
11 to 11:35 a.m.)

12 **DR. WADE:** Okay, the working group's going to
13 get back to business. Would the one person on
14 the line identify that you can hear us?

15 **UNIDENTIFIED:** I can hear you guys.

16 **DR. WADE:** Okay, good. Thank you.

17 **DR. ANIGSTEIN:** Okay. Bob Anigstein. I'm
18 okay.

19 **DR. WADE:** Anybody have any suggestions to make
20 as to our etiquette in terms of conducting the
21 conference call?

22 (No responses)

23 Again, I would ask that you mute if at all
24 possible.

25 Okay, Robert.

1 **MR. PRESLEY:** Okay, we are through five; is
2 that correct?

3 **DR. MAKHIJANI:** We're at five.

4 **DR. MAURO:** We're at five.

5 **RESUSPENSION MODEL/FACTOR**

6 **MR. PRESLEY:** We're at five, all right. Arjun,
7 you want to go ahead and kick off with the
8 comments on five?

9 **DR. MAKHIJANI:** Comment five reads (reading)
10 Resuspension model and resuspension factor are
11 not scientifically defensible or claimant
12 favorable due to a variety of factors. Doses
13 may be underestimated by an order of magnitude
14 or more. Mass-loading approach would be
15 preferable for internal dose.
16 And this is one of the areas -- so that's the
17 end of the comment. But this is one of the
18 areas where we do have a disagreement with
19 NIOSH in terms of the NIOSH response. NIOSH
20 did not agree that their dose estimates could
21 be that much off. NIOSH again referred to the
22 -- the paper by Anspaugh in *Health Physics* of
23 2002. We did look at this paper in the process
24 of preparing the review and felt that it hadn't
25 been appropriate -- the research in the paper

1 hadn't been appropriately used in the site
2 profile in terms of guidance for dose
3 estimation. So I'm going to -- I'm going to
4 just stop my comment there because John was
5 really the point person for us in terms of this
6 issue so I'm going to just leave the rest to
7 him.

8 **DR. MAURO:** Yes, the comment goes on quite a
9 ways, and you captured basically it all. And
10 you folks disagree, and we respectfully accept
11 your disagreement. And I've been looking into
12 this a bit. your -- in effect, what the --
13 what we're dealing with here is after 1962
14 you've got people working at the site and there
15 is radioactivity on the ground. And there are
16 some 26 or so different areas throughout --
17 gigantic areas, big areas. You know, 50 square
18 miles here, 200 square miles there. And
19 correct me as I try to step back and -- the big
20 picture. I'm saying okay -- and -- and there's
21 this radioactivity that has built up on the
22 ground from the above-ground testing that took
23 place from '51 to '62. Now you've got this
24 inventory -- okay? -- in each of these major
25 regions.

1 Okay, then -- now you move into the post-'62
2 time period. And now we have people on site
3 doing all the different things that they were
4 doing, including underground testing and -- and
5 I'm visualizing that -- people go on site and,
6 depending on the -- where they are, the amount
7 of radioactivity that's in the soil could
8 differ from one place to another. And the data
9 are here, lots and lots of good data
10 characterizing the activity in each of the
11 different -- different regions. But remember,
12 these regions are big. You know, 50 square
13 miles or more.
14 And people go there and the -- now the approach
15 taken was okay, we know it's on the ground.
16 Aerial surveys, I guess they were at -- lots of
17 different kinds of surveys performed to
18 characterize the radionuclide distribution in
19 these areas and in -- and in the entire site.
20 There's also data collected I believe after
21 1971 on air sampling, I believe there may have
22 been lots of air samples. Each region may have
23 had its own sampler, and please correct me as I
24 try to capture the big picture. So you almost
25 could see as -- you got this gigan-- this -- an

1 area the size of a state, broken up into
2 perhaps 26 or so different sub-areas. Each
3 sub-area has been well-characterized in terms
4 of -- by aerial sur-- flight surveys, also by I
5 believe in situ jelly detection systems, and
6 there's also an air sam-- I don't think it's a
7 -- I think it's a low volume air sample,
8 continually running all the time -- all the
9 time -- collecting a sample of air. Okay?
10 Now, there's your data. Okay? For -- okay,
11 here's our start -- here's the rock we're going
12 to stand on, and now we superimpose people,
13 people are showing up now in these areas, and
14 they're going to do whatever they do. And as I
15 understand it, the way in which the dose is
16 reconstructed to a given individual is to say
17 okay, where was this person, as best we can
18 tell, and on that basis -- and here's where I'm
19 not quite sure exactly what was done. On that
20 basis we're going to say okay, for this time
21 period, this person -- and remember, this is
22 after the SEC period so we are doing dose
23 reconstructions now -- this person was located
24 for this -- in this year at this location. And
25 this location, remember, is this very lar-- by

1 -- when I say location, it's -- you know, 50
2 square miles. And they take their best
3 estimate of what they believe is the airborne
4 radioactivity -- average airborne radioactivity
5 in that sector over that year and assign it as
6 being the airborne concentration to which this
7 worker was exposed. Then they assume some
8 standard breathing rate -- 1.2 cubic meters per
9 hour -- and they assume the appropriate
10 chemical form, I believe, to give the maximum
11 dose to the organ.

12 Now, the place I ran into a little bit of
13 difficulty and -- in our commentaries has to do
14 with averaging over this whole area, this big
15 area, averaging -- just sort of sm-- as it was
16 uniform area. And I'm not quite sure whether
17 they depended primarily -- it -- it seems to me
18 they had two sources of information for this
19 guy. One is the air sampling that was
20 collected, which was -- started I believe in
21 the '70s. Of course now we want to reconstruct
22 the dose to the guy from '62 to '70. Other
23 words, there's this ten-year period where --
24 people were there, too -- where -- where I
25 don't think you have the air sampling data.

1 And again, correct me as I go through my story
2 -- so you really have really good air sampling
3 data for these large areas, starting in early
4 '70s. You don't really have it in the earlier
5 years. So you have air sampling data.
6 But then they do something else. They say
7 well, we also know what the activity is on the
8 ground from the aerial surveys and we could use
9 -- another approach is don't let's use the air
10 sample. We could theoretically als-- also use
11 the resuspension factor approach. Now the
12 resuspension factor approach is where Lynn
13 Anspaugh comes in and the work he's done. And
14 he basically has an -- a ver-- an -- his work,
15 his research over the years demonstrated that
16 for fresh fallout, which doesn't really apply
17 here, you start at a resuspension factor of ten
18 to the minus five. For those folks who don't
19 play in the world of resuspension factor, this
20 means that if you know how many picocuries per
21 square meter you have, you multiply by the
22 resuspension factor and you get picocuries per
23 cubic meter. So it's picocuries per cubic
24 meter per picocurie per square meter. It's an
25 empirical relationship so that it's expressed

1 in per meter. All right? So you multiply the
2 activity on the ground by a resuspension factor
3 and you get the activity in the air. All
4 right. So -- and in principle, that -- that's
5 great.
6 Now it turns out, though, that the resuspension
7 factor equation changes as function of time.
8 It starts at a very high level, on the order of
9 around ten to the minus five for fresh fallout,
10 because when it's fresh fallout it's very
11 available for resuspension. As time goes on,
12 the evidence is that it gets more and more
13 worked in, then you go -- and this very nice
14 curve going from one -- one times ten to the
15 minus five -- this is a curve with -- the
16 resuspension factor is a function of time.
17 Okay? You -- all -- you can't see it, but you
18 could -- you could basically visualize -- it
19 starts at times zero, at ten to the minus five,
20 then it drops like a rock over the course of
21 days. Within a matter of ten, 20, 30 days, it
22 drops down to ten to the minus eight, and then
23 it goes down to ten to the minus nine, so the
24 spread on the resuspension factor, based on
25 this work done by Lynn Anspaugh, goes -- goes

1 from ten to the minus five to ten to the minus
2 nine per meter. Okay? So we're talking four
3 orders of magnitude.

4 Now -- I'm sorry for going on, but I want to
5 paint a picture. So -- but now there's also
6 the concern that -- there's a perturbation on
7 these -- on this very nice, clean line, and
8 that is if a truck goes by, if it's windy that
9 particular day, if there was venting from a --
10 a test, what's going to be airborne. So in
11 other words, I -- I think this represents sort
12 of like a baseline of what your best estimate
13 might be of the resuspension factor averaged
14 over large areas.

15 But I'm more concerned about the fine
16 structure. I think this is where my issue
17 comes from is that well, if you go to any one
18 worker who may have worked in a given location
19 in a given year, averaging over this 50 square
20 miles may not represent where he really was and
21 his experience. Also, the -- in terms of the
22 activity on the ground. And then on top of
23 that, using the resuspension factor -- which I
24 -- which is sort of like your baseline
25 resuspension factor, but if there was a

1 perturbation or lots of perturbations, the
2 concentrations of dust in the air could easily
3 be two to three orders of magnitude greater
4 than the sort of baseline. If in fact you had
5 a wind, a truck going by, there was some
6 excavation activity going on, if there was
7 certain venting going on, this would have no
8 applicability at all. So my -- my problem is -
9 - it's almost as if -- where my criticism comes
10 in is your -- your -- the view of the
11 inhalation dose to workers from -- from
12 resuspension is a macro view, as if things were
13 averaged over very large areas. But in
14 reality, when you get down to an individual
15 worker, what he really experienced is a local
16 view of what was going on during the time
17 period he was working at a very specific
18 location or locations, certainly not averaged
19 over 50 square miles. And where there were
20 transients from day to day, depending on the
21 anthropomorphic activities that were going on,
22 where that resuspension factor may not work.
23 So what -- what troubled me is -- is -- now I -
24 - I -- I just in a -- in a couple of minutes
25 tried to capture the sense that's commu-- that

1 I understood from reading the -- the report.
2 And I've tried to communicate to you in a
3 general sense why I think that there is -- you
4 may not really be giving the benefit of the
5 doubt to this particular guy. Maybe in the
6 aggregate, if you were looking at 1,000 workers
7 that worked in the -- at the site in a given
8 year, it would sort -- maybe it will average
9 out around there. But I'm concerned that --
10 what about the guys who might be at the high
11 end. And if -- and if there's a way to make a
12 distinction between those, maybe we've got a
13 tractable situation. But right now -- I mean
14 that's the -- it's a very common sense kind of
15 argument and concern that I just presented.
16 And I guess -- and in fact what we -- what Bob
17 Anigstein and I did over the weekend -- Bob is
18 on the line -- is Bob helped out by writing
19 this up as -- and -- and -- what our concerns
20 are, so I was hesitant in distributing it, but
21 why not. So we've got a very crude write-up
22 that Bob Anigstein prepared last night -- until
23 about midnight perhaps -- and e-mailed it to me
24 at 4:00 o'clock this morning. I brought it
25 with me. I read it on the plane and I like it.

1 I said this is good. This tells a story that I
2 -- the story I just told is -- is here. And in
3 fact, Bob, if you -- if there's anything you'd
4 like to add that you think would add value to
5 the very general picture I painted, please do
6 so. But in the meantime I'm going to go ahead
7 and distribute this write-up for -- for -- you
8 know, so you guys can go ahead and take a look
9 at it.

10 **DR. ANIGSTEIN:** Yeah. No, I -- I think -- I
11 completely agree with what you said, John. But
12 to expand on it a little further, not only is
13 the issue about assigning a site-wide -- a
14 area-wide intake to each individual in that
15 area -- as you say, the areas go from anything
16 to a fraction of a square mile to, according to
17 the TBD, 148 square miles, area 19. And I
18 think that this is in stark contrast to the
19 work and the conclusions for Bethlehem Steel
20 where there were many air samples for each
21 location and there was a lot of discussion and
22 final resolution of which of those air samples
23 or which group of air samples for a specific
24 work location would be the limiting ones, would
25 be the applicable ones. And here -- so there

1 you go from say one rolling mill -- one -- one
2 roller, excuse me, one -- one roller was in
3 that mill, having a different dust
4 concentration than another roller. And here
5 we're talking about, as you say, tens and --
6 tens of square miles being assigned a single
7 value. So that does not seem to be in the same
8 spirit.

9 Furthermore, when the -- according to the TBD,
10 if the area -- if the worker was not assigned
11 to a specific area or it could not be
12 determined which area he worked in, he's given
13 this site-wide average, meaning this whole
14 Nevada Test Site is going to be represented by
15 a single value for intake. And that certainly
16 seems not claimant favorable.

17 **DR. MAURO:** I'd like to add one more --

18 **MR. ROLLINS:** Excuse me, that was not -- part
19 of our response was that we were going to
20 change the instructions in the TBD about which
21 value to add under which -- under which
22 circumstances, and I believe we agreed that
23 that was not claimant favorable to do it that
24 way and in our response we had a proposal to do
25 it a different way. And I'd like to know if

1 you have a problem with what we are proposing -
2 - the change that we are proposing to make.

3 **DR. MAURO:** I should take another look at that.

4 **MR. ROLLINS:** Okay.

5 **DR. MAKHIJANI:** If you could -- could you point
6 me to a page? Sorry, I -- I didn't pay
7 detailed attention --

8 **MR. ROLLINS:** Well, it's been a while since I
9 wrote this so give me just a second.

10 **MS. MUNN:** I think it's page 11.

11 **MR. ROLLINS:** It should be very close to the
12 end -- yeah, on page 11.

13 **MS. MUNN:** Page 11, I believe.

14 **DR. WADE:** Maybe you could just walk us through
15 that approach.

16 **MR. ROLLINS:** I think -- I can -- could I have
17 my -- my copy back there that I -- yeah, at --
18 at the very end of this discussion in the TBD,
19 after the resuspension factor, there's a table
20 down here that provides average and maximum
21 intakes based on this resuspension factor and
22 average and maximum concentrations in the soil
23 across the site. And in my response I go
24 through in some detail talking about how the --
25 the air sampling data supports this and is --

1 it's not too far off, it might be a slightly
2 overestimate or slight underestimate, but I
3 think if you read through my discussion, it
4 basically makes -- it makes a case that says
5 the average intakes given in Table 4.2.2-3 are
6 reasonable underestimates. And I think --
7 number one, they don't ever give an organ dose
8 more than one millirem every year for any
9 organ, so that's got to be an underestimate
10 because we would throw them all out anyway, we
11 wouldn't use them. Okay? So it's not -- it's
12 not claimant favorable to use those and we -- I
13 say that in my response, that we're not going
14 to do that anymore.

15 In fact, what I'm proposing in my response is
16 that we will use the maximum intakes given in
17 that table for -- and if the -- if the case
18 goes compensable on that, then we will do a
19 more detailed evaluation to determine if it's
20 appropriate to give that level or some lower
21 level, but only if it makes a difference in
22 compensability, because for most cancers it
23 would not.

24 **DR. MAURO:** So -- so there's --

25 **MR. ROLLINS:** There are a few that it would.

1 **DR. MAURO:** -- there's a -- there's a table. I
2 know one of your tables has the ma-- the max
3 numbers, yes.

4 **MR. ROLLINS:** That's it right there.

5 **DR. MAURO:** Yeah and -- now when I looked -- in
6 fact I did some calculations. When I looked at
7 the table, what -- in effect -- to convince
8 myself the maximum numbers represented
9 reasonable maximum numbers, you look -- you
10 look at the activity that's on the ground, pick
11 -- if you pick the americium that was in
12 location number 20, which was the -- I think
13 one of the worst locations, area 20 --

14 **MR. ROLLINS:** Area 30.

15 **DR. MAURO:** Area 30 it was? Looking at --

16 **MR. ROLLINS:** Which is a very small area --

17 **DR. MAURO:** Oh, yeah, okay, yeah, 20 was --

18 **MR. ROLLINS:** -- very -- very inaccessible, by
19 the way.

20 **DR. MAURO:** Yeah, I -- I actually used 20. I --
21 -- I didn't even look -- see 30 down on the
22 bottom there, I just saw 20. But any event --
23 and I did -- and I -- in fact I did some calc--
24 did some calculations to convince myself that
25 we come in sort of in a way -- see, I'm not --

1 are you using the resuspension factor approach
2 or the actual measured airborne dust loading
3 when you -- when you come at -- come up -- in
4 other words, for the maximum numbers.

5 **MR. ROLLINS:** What I did, I used the
6 resuspension, and then I compared them to the
7 actual air monitoring data.

8 **DR. MAURO:** Okay.

9 **MR. ROLLINS:** And in every case the
10 resuspension, as I developed it, appeared to be
11 claimant favorable 'cause it gave higher intake
12 numbers than the actual air sampling data for
13 those areas.

14 **DR. ANIGSTEIN:** That's -- that's using the
15 resuspension of 1.3, ten to the minus eight.
16 Correct?

17 **MR. ROLLINS:** Yes, I put in -- I put in a
18 safety factor of ten.

19 **DR. ANIGSTEIN:** Right.

20 **MR. ROLLINS:** And that's in that table that
21 shows the maximum value. So I already
22 increased it.

23 **DR. ANIGSTEIN:** Are we still -- but -- but the
24 comment made earlier still holds, that even for
25 the maximum, it's simply the highest of those

1 20-odd areas, but it's still an area-wide
2 value.

3 **MR. ROLLINS:** And I'll -- and I'll also make
4 one more comment, and it's in my response, that
5 if -- if someone were routinely exposed to
6 those annual intakes, it would be detectable
7 under the methods in use at the time by
8 bioassay monitoring programs.

9 **DR. MAURO:** But you were only looking at
10 plutonium at the time.

11 **MR. ROLLINS:** That's right.

12 **DR. MAURO:** And you're not going to see
13 plutonium in urine unless it's really up there.

14 **MR. ROLLINS:** That will put it up there.

15 **DR. MAURO:** Oh, so in other words, high --

16 **MR. ROLLINS:** If you -- if you get those
17 numbers every year, it will put it up high
18 enough to where it should be detectable.

19 **DR. MAURO:** That was one of my other com--
20 high-fired plutonium?

21 **MR. ROLLINS:** Well, this doesn't -- this is not
22 super S assumption.

23 **DR. MAURO:** Okay.

24 **MR. ROLLINS:** All right. We're not -- we're
25 going there in the future, but we're not there

1 yet. Okay? Under the typical models now used
2 in IMBA, my calculations are they would have
3 been detectable at their MDAs in use at the
4 time, so if there was a widespread problem,
5 they should have seen it. They didn't do a
6 great deal of bioassay, but they did do enough
7 that if there was a widespread problem, it
8 should have been -- it should have shown up.

9 **MS. BRACKETT:** This chapter --

10 **DR. ANIGSTEIN:** But that neglects -- see, you -
11 - you make the -- the one hand is favorable --
12 the claimant-favorable assumption that
13 plutonium is type M due to the safety tests
14 where they didn't actually explode a weapon but
15 just -- I mean they didn't detonate a weapon,
16 they -- they dispersed it, what we today call -
17 - what we'll today call a dirty bomb. However,
18 claimant favorable if you know the intake, you
19 know how many becquerels were taken in, more of
20 it goes to the organs if it's type M. However,
21 the opposite, where you're looking for it in
22 urine, if it's type S or super S, you won't see
23 it in the urine at all, and yet it could be in
24 the lungs.

25 **MR. ROLLINS:** Well, they -- they did do chest

1 counting, as well. And we're not --

2 **DR. ANIGSTEIN:** What is the lowest -- I'm just
3 curious what the lower level of detection for
4 plutonium-139 and 140 -- 239 and 240 is.

5 **MR. ROLLINS:** Give me a minute and I'll tell
6 you.

7 **DR. ANIGSTEIN:** With the -- with the chest
8 count.

9 **DR. WADE:** Is there somebody on the line trying
10 to ask a question or make a comment?

11 **MS. BRACKETT:** There -- I -- I just wanted to
12 point out, I -- this is the environmental
13 chapter, so this is only assigned to people who
14 are not monitored -- unless this site is
15 working differently than the rest, it's only
16 used for people who were not thought to have
17 had routine exposures to radioactive materials,
18 just people who would have had background
19 levels. And if the person had a job such that
20 they would have routinely been exposed to
21 radioactive material, then a full dose
22 reconstruction would be done based on chapter
23 five, the internal dosimetry chapter. So I
24 just wanted to make sure that that was clear.
25 And if they had bioassay, then this would not

1 apply. It would be based on their bioassay
2 results.

3 **DR. MAURO:** Yeah, I was more concerned that the
4 -- in the end, the point that was made that
5 well, if it was in fact much higher, we would
6 have seen it in the urine, that's sort of like
7 the final word and I would agree with that.
8 That is -- yeah, you know, if you have enough
9 bioassay data for these workers that -- that
10 demonstrates that yes, this model bounds it, I
11 would say yes to that. But -- and then in the
12 end, where I came out was do you have enough
13 data and are we pretty sure it's not super S.
14 Because if it's super S, then that is not a
15 validator. In other words, I don't think -- I
16 don't think you -- you'll --

17 **MR. ROLLINS:** Except -- except for the lung.
18 Now --

19 **DR. MAURO:** If you did chest counting.

20 **MR. ROLLINS:** The chest count MDA for
21 plutonium-239 was 7.3 nanocuries in 1993, and
22 for --

23 **DR. MAKHIJANI:** You've got a maximum intake
24 here of plutonium-239 per year of 20
25 becquerels, 20 times 30, that's about .6

1 nanocuries per year.

2 **DR. MAURO:** And there -- would you say below
3 the limit of detection?

4 **DR. MAKHIJANI:** So that --

5 **MR. ROLLINS:** 7.-- well, for 239 is 7.3.

6 **DR. MAKHIJANI:** So I think it's well under the
7 detection limit, at least on an annual basis,
8 and then --

9 **MR. ROLLINS:** But then it's going to continue
10 to accumulate unless it shows up in the urine.

11 **DR. MAKHIJANI:** Yeah, but it has to accumulate
12 for a lot of years before you'll be able to see
13 it.

14 **DR. ROESSLER:** What kind of doses do those
15 levels give? Are we talking --

16 **MR. ROLLINS:** They're in the response. If you
17 look in the --

18 **DR. ROESSLER:** When you talk about --

19 **MR. ROLLINS:** -- response, I have a table
20 there that show.

21 **DR. ROESSLER:** The numbers here look so little
22 to me that I'm wondering if we're talking about
23 something that really is important or if it's
24 just -- you know, with regard to the actual
25 doses people get, which would then result in

1 actual compensation, is this something that --
2 that's a really big, important thing, or are
3 the doses so low that --

4 **MR. HINNEFELD:** I think there are a couple --
5 there are a couple of things to think about in
6 terms of how much time do we want to spend
7 hashing this out. One is exactly that, how
8 high will these doses be. And the second is
9 the point that Liz made, from a dose
10 reconstruction standpoint, the environmental
11 dose is applied to someone who is correctly not
12 monitored. Okay? Not only not monitored, but
13 correctly not monitored. And so that's when
14 this kind of a dose would be added to that. So
15 a person theoretically who is a -- and hands-on
16 worker, whether it be a construction worker or
17 whatever, working in a contaminated area would
18 fall into the category of an exposed worker.
19 And whether you had bioassay data for that
20 person or not, you would have to do some sort
21 of internal dose assessment for that person,
22 either based on their bioassay record or some
23 sort of coworker approach rather than an
24 environmental approach.

25 **DR. MAURO:** What about this time period from

1 '62 to '71 when -- and here's where I have to
2 admit I'm not quite sure if I understood what
3 was being said. There's -- wasn't there about
4 a ten-year window where the data for these
5 workers and -- not only air-- airborne samples
6 but bioassay data for the workers outdoors, you
7 didn't -- you have to somehow go with a
8 surrogate, or do you have direct data? Other
9 words, were all these -- there was something
10 about sixty -- seven -- '62 -- '63 to '71 that
11 was this hole, and I was worried that how --
12 you know, even with these methodologies and
13 some of the limitations that I expressed
14 concern about, then you were going to somehow
15 apply that to the ten-year period before and --
16 so -- you could see that -- there were these
17 confounding questions that -- that popped into
18 my mind as I read it, and I'm hoping that the
19 write-up that I distributed does a better job
20 than I just verbally explained. And it may
21 turn out that we're dealing with a problem
22 that's a non-problem.

23 **DR. ROESSLER:** That's what -- that's what I
24 think we need to clarify --

25 **DR. MAURO:** And I'll be the fir-- I'm not sure,

1 'cause I didn't check -- although I noticed in
2 your write-up you did mention a couple of
3 places we're talking about less than one
4 millirem and -- and --

5 **MR. ROLLINS:** In the response there's a --
6 there's a table. Now that table represents
7 integrated doses --

8 **DR. WADE:** Could you point out the table?

9 **MR. HINNEFELD:** 13?

10 **MR. ROLLINS:** 13, yeah, the --

11 **MR. HINNEFELD:** 13.

12 **MR. ROLLINS:** In fact the -- where we change
13 our position on how we're going to apply those
14 intakes is in the last paragraph on page 11,
15 the last two sentences, which I agreed that it
16 was not necessarily claimant favorable to give
17 so we're going to give maximum, unless it
18 affects compensability.

19 **MR. HINNEFELD:** And we may still at that point.

20 **MR. ROLLINS:** And we may still at that point.

21 **MR. HINNEFELD:** If we can't -- if we can't --
22 further than the maximum -- we'll use that,
23 yeah.

24 **DR. MAURO:** And your -- and your -- now the
25 reason --

1 **MR. ROLLINS:** Now if you want to see -- excuse
2 me. If you want to see what the impact of the
3 doses would be, you go to these tables. Now
4 understand what these tables are. These are
5 30-year integrated doses based on ten years of
6 intake at the concentrations given in these
7 average and maximum table.

8 **DR. MAKHIJANI:** Which tab-- which page --

9 **DR. MAURO:** He's on page 12.

10 **MR. ROLLINS:** This is page 13.

11 **DR. ROESSLER:** Table 2 is what you're talking
12 about?

13 **MR. ROLLINS:** This is -- these are the maximum
14 values and those are given in -- what's the
15 number of the table?

16 **MS. MUNN:** Table 2.

17 **MR. ROLLINS:** 4.2.2-3, right. And so you can
18 see by looking at these that -- there are only
19 a few organs that are potentially affected that
20 it could potentially affect compensability.

21 **DR. ROESSLER:** In fact one of them's -- under
22 plutonium-239 is ET, and I have to admit my
23 ignorance of biology, what is that?

24 **MR. HINNEFELD:** Extra-thoracic, respiratory
25 tract.

1 DR. MAURO: Up here.

2 MR. HINNEFELD: Back of your throat.

3 DR. ROESSLER: Okay.

4 MS. BRACKETT: It's always ET-1 or ET-2.

5 MR. ROLLINS: It's always ET-1 or ET-2.

6 MR. HINNEFELD: It's probably ET-2.

7 DR. ROESSLER: Okay.

8 MR. ROLLINS: And LNET is used for lymphoma.

9 MR. HINNEFELD: Yeah, LNET is --

10 MR. ROLLINS: LNET could be very important.

11 MR. HINNEFELD: -- thoracic lymph nodes, LN --

12 LNET -- actually LNET is the lymph nodes in the

13 ET region.

14 DR. ROESSLER: Oh, and they're the bigger ones,

15 yeah.

16 MR. HINNEFELD: LNTH is thoracic lymph nodes.

17 DR. ROESSLER: So that's -- that's --

18 MS. BRACKETT: That's over 30 years, so that's

19 not the (inaudible).

20 MR. ROLLINS: That's 30 years of dose from ten

21 years of exposure.

22 DR. ROESSLER: So it's a really maximum.

23 DR. MAURO: Yeah, it's up there.

24 DR. ROESSLER: So what does that --

25 MR. ROLLINS: That's a -- that's a reasonable -

1 - I wanted to get something that was -- okay, a
2 guy worked out there for ten years, this is a
3 30-year dose --

4 **DR. ROESSLER:** What does that mean in terms of
5 compensability then? I mean if you took --

6 **MR. ROLLINS:** Well, my experience, and I've
7 done -- I've done a number of these cases. My
8 experience is if you've got any kind of alpha
9 intake and you've got a lymphoma that requires
10 dose to the LNTH, it's almost always going to
11 be compensable because the doses are so high.
12 Doses to the lung, typically for a smoker, for
13 it to go compensable, depending on if it has a
14 reasonable latency period, you're talking 60
15 rem to get a com-- to get a compensable case.

16 **DR. ROESSLER:** And go back to the lymph nodes -
17 -

18 **MR. ROLLINS:** If it's -- if it's a non-smoker,
19 it's going to be about half that.

20 **DR. ROESSLER:** And what does it take for the
21 lymph nodes for it to be compensable?

22 **MS. BRACKETT:** It depends on the cancer type.

23 **MR. ROLLINS:** If it's a lymphoma -- I haven't
24 done too many of these because usually --
25 usually when I've done them, the doses just go

1 astronomical. They go up in the hundreds and
2 200 rem, so --

3 **MR. HINNEFELD:** Yeah, the LNTH dose component
4 is really high, so if you've got any kind of
5 alpha internal exposure --

6 **DR. ROESSLER:** You're going to get a higher --

7 **MR. HINNEFELD:** -- chances are the LNTH will be
8 high enough to make a lymphoma compensable.

9 **MR. ROLLINS:** And more than likely those
10 individuals are going to be compensable before
11 you -- before you even consider this.

12 **DR. ROESSLER:** So I'm just trying to evaluate
13 the importance of how much time we're spending
14 on this particular topic. Is -- is this really
15 significant or isn't, and I haven't heard any -
16 -

17 **DR. MAURO:** Yeah, let me see if I could boil it
18 down as I'm trying to see -- and looking at
19 your numbers. What -- what I see is that the -
20 - using the maximum concentration -- in other
21 words, the maximum be -- in terms of what's out
22 in the soil or whether -- and was -- air
23 sample, reflects a particular location, whether
24 either the air sample was collected for that
25 year -- I mean in that reg-- 'cause I think it

1 was -- get this -- this 50-mile area, you got
2 an air sample. Also you've got the 50-mile
3 area and you've got these contours where, if
4 you looked at the contours you see that if you
5 average it there are going to be very large
6 areas that are ten times higher. Okay? So --
7 now -- so we have that.

8 So we realize that within this box that we call
9 the area of interest where we're going to do
10 this maximizing dose calculation, you do -- you
11 do have the potential for some locations to be
12 ten times higher. Whether or not the workers
13 spent a lot of time there may be unplausible
14 (sic), or may be plausible, I'm not sure. As
15 we understand about it, I believe the air
16 samples were generally taken where the workers
17 were is the way the text read, so -- sort of in
18 support of your argument, so it's unlikely that
19 you're going to have a worker spending ten
20 years at the worst contour location on a given
21 location within the site.

22 Then we have this -- okay, that -- that --
23 that's -- so we're talking about perhaps a
24 factor of ten un-- using your method there may
25 be a situation where a worker might have gotten

1 a factor of ten higher there. And then on the
2 resuspension side, let's say we're talking the
3 resuspension factor. You have to -- you -- now
4 -- you went on the order of ten to the minus
5 eight. Now I know that you're going to -- you
6 know, that -- now -- I look -- I'm familiar
7 with the resuspension literature and -- and it
8 easily goes ten to the minus six under cert--
9 certain circumstances where there's
10 anthropomorphic activities. And in fact you
11 sort of get away from the resuspension factor
12 approach and you go to the dust loading
13 approach where you know the gra-- picocuries
14 per gram. All I'm -- I guess all I'm really
15 saying is that I've got all of these facets of
16 the issue in my head right now. I'm looking at
17 the doses and I ask myself is it possible that
18 some of these doses for some worker might be a
19 hundred times higher. And I guess if I could
20 convince myself that no, that's not going to
21 happen, and if it does happen it makes the do--
22 these are very, very small doses, they're still
23 small, but the -- and the big doses that you
24 have, they -- which are already compensable in
25 accor-- to the lungs, the ET1 and ET2, they're

1 going to go -- if they go up by a factor of
2 100, they're going to be even more compensable.
3 I'm just trying to get to grips is the -- the --
4 - the machinery that you're putting in place
5 for doing the dose reconstruction for these
6 workers, whether or not in the end we're -- you
7 know, there's a significant possibility that
8 some of the people are not going to get a fair
9 deal out of this. And I'm not entirely
10 convinced yet, although the arguments you're
11 making are very compelling. That's where I
12 come out. Bob, I know you had -- you looked at
13 this --

14 **DR. ANIGSTEIN:** Yeah, I'd like to add one
15 comment to what was said about the lung
16 counting. I did a quick calculation using the
17 ICRP tab-- model, and the lung dose at 7.3
18 nanocurie, which was the lower limit of
19 detection, that corresponds for say one micron
20 -- as example, one micron type S slow
21 plutonium-239 gives a lung dose of over two
22 rem.

23 **DR. MAURO:** Yeah, we -- we -- we -- we're
24 hearing --

25 **DR. ANIGSTEIN:** That is -- that is for a single

1 intake, of course, but that does not mean it's
2 two rem per year, because it probably -- I
3 don't know what the resonance time is, but I
4 don't know how long those seven nanocuries
5 would sit in the lung.

6 **MR. ROLLINS:** Is that -- is that a 50-year dose
7 that you --

8 **DR. MAURO:** That's a committed --

9 **DR. ANIGSTEIN:** That's a 50-year --

10 **MR. ROLLINS:** Okay, well, divide it by 50 and
11 that's a rough estimate.

12 **DR. MAURO:** Per year.

13 **MR. ROLLINS:** Yeah, per year, which is
14 inconsequential to a lung cancer.

15 **DR. MAURO:** And you --

16 **MR. ROLLINS:** As far as POC is concerned.

17 **DR. MAURO:** And you're talking 60 is what
18 you're looking for as a thre-- to -- to get --
19 to get you over.

20 **MR. ROLLINS:** Sixty total.

21 **DR. MAURO:** Tot-- total.

22 **MR. ROLLINS:** Between --

23 **DR. ROESSLER:** Say that again.

24 **MR. ROLLINS:** -- between the intake and the
25 date --

1 **DR. ANIGSTEIN:** Actually --

2 **MR. ROLLINS:** -- of diagnosis.

3 **DR. ANIGSTEIN:** -- the one-year dose -- 50-year
4 dose -- one-year dose is half of that -- if
5 we're talking now about the overall, over one
6 rem.

7 **MR. ROLLINS:** -- be possible.

8 **MS. MUNN:** I don't think so.

9 **MR. ROLLINS:** And you wouldn't have an acute
10 intake of 7.3 anyway. It would be over a
11 period of time.

12 **DR. ANIGSTEIN:** Yeah, but the question is -- I
13 mean the -- we probably can't do this on line,
14 but the question is this 7.3 nanocurie
15 detection limit would have to be -- if there's
16 a chronic intake, this would have to be a fac--
17 would have to factor in the resonance time and
18 see what kind of a chronic intake correspond to
19 an av-- to a 7-nanocurie lung burden, which is
20 a very different question than if it was a
21 single episodic intake and you would count it
22 shortly afterwards before there was any
23 clearance.

24 **MR. ROLLINS:** We're going to run those numbers
25 right now.

1 **DR. ANIGSTEIN:** Excuse me?

2 **MR. ROLLINS:** We're going to run those numbers
3 right now if you'll give us a minute.

4 **MS. BRACKETT:** Well, not what he just said.

5 **MR. ROLLINS:** Oh, oh, excuse me.

6 **MR. HINNEFELD:** Well, we could pro-- we could
7 propose this. I mean Bob's -- or John has
8 provided additional piece of information. We
9 could kind of lay out -- I think Gene did a
10 good job in his response. We'll kind of
11 organize it maybe slightly differently, say
12 average based on this approach, maximum based
13 on this approach, dust loading approach -- you
14 know, gives us these various numbers. Measured
15 concentrations were this and, you know, and --
16 and then -- and looking at this, see where we
17 are on that, do some, you know, organ dose
18 numbers at the various levels, propose some
19 dose reconstructor instructions that would go
20 along with this.

21 **DR. MAURO:** I think we have a communica-- more
22 of a communication issue here than a scientific
23 disagreement.

24 **MR. HINNEFELD:** I think so.

25 **DR. MAURO:** Because the information that's

1 contained in this report is complex. There's a
2 lot of different information related to how you
3 come at the problem, what data are using -- be
4 used for what circumstances, and -- and as a
5 result of that, I wa-- I walk away with a
6 degree of discomfort that I tried to capture --
7 Bob and I tried to capture in the write-up. I
8 have a funny feeling the more we talk, the more
9 we're going to converge and -- and see it the
10 same way 'cause the -- the -- you know, so I --
11 I think we still have an unresolved issue, but
12 I think that we have a path forward where I
13 think as long as we can maintain our dialogue
14 going on, I think we'll be able to be okay on
15 this.

16 **MR. ROLLINS:** I agree. From a practicality
17 point of view, what I was trying to do and -- I
18 was trying to come up with something that
19 everybody could agree was an underestimate and
20 some-- and something that we could all agree
21 was a reasonable overestimate that we could
22 apply --

23 **DR. MAURO:** Uh-huh.

24 **MR. ROLLINS:** -- to keep -- to keep the dose
25 reconstructions moving forward.

1 **DR. MAURO:** Uh-huh.

2 **MR. ROLLINS:** And then in the very small number
3 of cases where it affected compensability, then
4 we sharpened the pencil.

5 **DR. MAURO:** I guess the place where I'm coming
6 out is I guess I'm not yet convinced that your
7 representation of the max overestimate is in
8 fact --

9 **MR. ROLLINS:** And that's what we have to go
10 back and work on.

11 **DR. MAURO:** And -- and -- and by the way, you
12 know, it may turn out you -- you did. But I --
13 I'd like to look at it a little bit more.

14 **MR. ROLLINS:** Right.

15 **DR. MAKHIJANI:** There's just one other issue --

16 **DR. ANIGSTEIN:** Also --

17 **DR. MAURO:** -- and I agree that the
18 underestimate piece of it is actually an
19 underestimate, so if you're -- like doing a
20 minimum dose estimate, you add that -- that
21 would be okay. But I think -- I -- I have an
22 issue with regard to this -- the scientific of
23 using resuspension at all and referencing the
24 Anspaugh paper, because in his paper he says
25 that resuspension coefficients should not be

1 used at times long after the deposition. And
2 so we're -- we're talking about deposition
3 during the atmospheric testing time, and then
4 using resuspension coefficients for the
5 underground testing time. So you know, many
6 years and decades afterwards. And it doesn't
7 seem very appropriate to do that.

8 **MR. ROLLINS:** I didn't disagree with that,
9 after going back and reading what he wrote. I
10 think I even quoted something in there, but he
11 also said, you know, if you've got air
12 sampling, pay attention to it.

13 **DR. MAKHIJANI:** Yes, right.

14 **MR. ROLLINS:** Which I did.

15 **DR. MAKHIJANI:** Okay. So there's -- there's
16 somewhere in there -- there's -- there's a
17 scientific issue to be resolved about exactly -
18 - justifying the resuspension approach that
19 would be 'cause I think -- partly you did that
20 in your response but --

21 **MR. ROLLINS:** In your response did you comment
22 on the simplified mass loading model that I
23 used? Like -- look -- it appears that you did.
24 I haven't had time to digest that.

25 **DR. MAURO:** Yeah, we did.

1 **DR. ANIGSTEIN:** Yes, can I say something?

2 **DR. MAURO:** Yes, please.

3 **DR. ANIGSTEIN:** Yeah. Yeah, we did -- we did -
4 - did some algebra writing it, and there is I
5 think a conceptual error or maybe a
6 communication error that even using -- the
7 statement is made in the response that the mass
8 loading model is consistent with a resuspension
9 factor of 1.3 times ten to the minus nine. We
10 don't find that to be correct because above 100
11 -- a factor of 100, and even used the upper 1.3
12 times ten to the minus eight, the mass loading
13 model gives you a factor of about ten higher
14 concentrations.

15 **MR. ROLLINS:** I'll take a look at that. I'll
16 look -- look forward to reading it.

17 **DR. MAKHIJANI:** And that's in the write-up.
18 You should be able to check that.

19 **MR. ROLLINS:** That's good.

20 **DR. ANIGSTEIN:** Yeah.

21 **DR. MAURO:** By the way, one thing I mentioned
22 earlier, I spoke to Lynn Anspaugh 'cause it --
23 recognizing that I think the -- his
24 contribution here could be very important, and
25 his take on all this. I called him and asked

1 if he would be interested in participating, not
2 realizing you had been in contact with him
3 also. If it's acceptable to the -- to the
4 working group, Lynn indicated that he would
5 have no problem signing up as an SC&A associate
6 and we could call upon him to participate in
7 the ongoing dialogue and get his take on a lot
8 of this. He -- his -- his reaction to me when
9 I called was listen, John, you know, I read --
10 I read carefully the site profile and I read
11 carefully your review of the site profile. And
12 his reaction was I have some serious problems
13 with the site profile, and I have some serious
14 problems with your review of the site profile.

15 **MS. MUNN:** What an (inaudible).

16 **DR. MAURO:** So that's the man you want, you
17 know, that's -- anyway, he's -- he indicated he
18 would be more than happy to work with us, or if
19 you'd prefer for him to work with NIOSH -- I
20 mean I think it's important that he be part of
21 this process.

22 **MR. ROLLINS:** I agree.

23 **DR. ROESSLER:** He should probably come to a
24 future Board meeting.

25 **DR. MAURO:** Yeah, he -- he -- he asked is the

1 next meeting -- face to face meeting, is that
2 going to be in Vegas? Yeah, he said I'll
3 absolutely be there, but -- and the conference
4 call -- I told him about the conference call
5 meeting and certainly he said he'll try to be
6 there, so -- you know, we're in the process of
7 -- I wanted to first make sure the working
8 group was okay with this -- like we brought Bob
9 Bistline aboard as the expert on high-fired
10 plutonium, Rocky Flats, I believe Lynn Anspaugh
11 is the equivalent of that for resuspension
12 factors at the Nevada Test Site and could help
13 us bring closure to this particular matter.

14 **MR. PRESLEY:** Is that agreeable with the
15 working group?

16 **MR. CLAWSON:** Yes.

17 **MS. MUNN:** Oh, yeah, he ought to be here.

18 **MR. PRESLEY:** Okay.

19 **MS. MUNN:** He's done so much work on it. Under
20 whose umbrella, I don't know, but...

21 **MR. PRESLEY:** We'll let Lew worry about that.

22 **MS. MUNN:** Go worry, Lew.

23 **DR. WADE:** I will worry.

24 **MR. PRESLEY:** Okay, let's see, we're through --
25 anybody have any more comments on five?

1 **DR. ROESSLER:** Could you summarize where we are
2 on five?

3 **MR. CLAWSON:** Well, we've painted a couple of
4 pictures here.

5 **MR. PRESLEY:** What I wrote down is I have an
6 issue, the fact that SC&A and NIOSH do not
7 agree on the findings and that what I wrote
8 down was that NIOSH will comment -- will come
9 up with some new information on this issue.

10 **MR. HINNEFELD:** The next product is ours.
11 We'll take what Bob has provided -- John has
12 provided, Bob wrote -- and we will try to --

13 **DR. ANIGSTEIN:** I have one more -- there's one
14 more comment that -- in my write-up, and this
15 is -- I looked at some other literature the
16 literature that I had available to me on
17 surveys at Nevada Test Site, and there was a
18 aerial survey done by the Remote Sensing
19 Laboratory, and the latest report I have -- I
20 don't know if they've done later surveys, but
21 it would be applicable to this time period --
22 survey was done on area 11 -- it was called --
23 also known as plutonium valley -- in January
24 1982, published in June 1983. And they have
25 this report. Mostly they just publish the

1 figures showing the isopleths of the -- of the
2 activity concentrations, but for this
3 particular one they went further and they did a
4 analysis to estimate the total inventory on
5 area 11, and they came up with a much higher
6 value than what is reproduced in the TBD in
7 section two in Table 2-8. Their value is
8 higher by I think a factor of ten --
9 approximately a factor of ten for plutonium.
10 Now, too, this is only one area.
11 Then also they use a smaller area -- a smaller
12 number of square meters for the area than is in
13 the TBD, so if you put the two together, you
14 end up with more than a factor of ten higher
15 concentration in terms of becquerel per square
16 meter. Now this is only one report and one
17 finding, but it should be examined in light of
18 the importance of the assigning activity
19 concentrations.

20 **MR. PRESLEY:** Mark, can you --

21 **DR. ANIGSTEIN:** The reference is provided at
22 the bottom of my write-up.

23 **MR. PRESLEY:** Mark, can you go ahead and look
24 at that with Tony and Mary and see the
25 difference between that and then the rest of

1 the site and see if -- it may be that we do
2 have a -- one site there that we need to break
3 out.

4 **MS. MUNN:** Area 11, given the map that SC&A
5 provided, looks as though it's a small area,
6 but the site of a number of atmospheric tests.

7 **MR. PRESLEY:** It's a very small site.

8 **MS. MUNN:** Yeah.

9 **MR. PRESLEY:** Back over on the mountain, if I
10 remember correctly.

11 **MS. MUNN:** Back over on the east side, right on
12 the east border.

13 **MR. PRESLEY:** Yeah. It's actually at the foot
14 of the mountain there, if I remember where it
15 is.

16 **MS. MUNN:** SC&A page 53 shows it as several
17 miles east of the control point on the east
18 side of the Mercury Highway, right against the
19 eastern border.

20 **MR. HINNEFELD:** Yeah, about mid-way up the
21 range.

22 **MS. MUNN:** Right there, yeah, show a number.

23 **MR. HINNEFELD:** Well, the next -- but the next
24 product is ours. We'll prepare and -- what's
25 been discussed here and take in -- and the

1 paper John provided, try to lay out not only,
2 you know, our view of where -- where the
3 numbers came from, the validity and also maybe
4 a summary of dose reconstructor instructions
5 and kind of dose magnitude, 'cause it's not
6 clear to me really that this is -- this issue
7 warrants months -- you know, months of
8 discussion. You know, it may not, so -- but we
9 -- that'll -- next product is ours, to address
10 those issues. We'll provide that to all the --
11 all the working group members, as well as to
12 John and whomever he wants to specify on his
13 side.

14 **MR. PRESLEY:** I have 26 after, do we want to --
15 and we're getting ready to -- does anybody have
16 anything else on five?

17 (No responses)

18 Do we want to break for lunch before we start
19 on this six?

20 **DR. MAKHIJANI:** Mr. Presley, can we dispense
21 with six, because I think we've already covered
22 it.

23 **MR. PRESLEY:** I think we have, too.

24 **DR. MAKHIJANI:** Because it's average air
25 concentration when worker location is not known

1 is not claimant favorable. I think -- think we
2 already covered that. Maybe we could go to
3 lunch --

4 **MR. PRESLEY:** Yeah.

5 **DR. MAKHIJANI:** -- with one more under the
6 belt.

7 **MR. PRESLEY:** Yeah. I have no problems
8 whatsoever. Does anybody have any problem with
9 dispensing with seven -- I mean with six,
10 please, and starting with seven when we come
11 back?

12 **MS. MUNN:** So is six going to drop off our
13 matrix next time?

14 **DR. MAKHIJANI:** No, we've --

15 **MR. HINNEFELD:** No, it'll be part of...

16 **DR. MAKHIJANI:** -- covered it, because it'll be
17 part of the NIOSH...

18 **MS. MUNN:** It'll be covered in five.

19 **MR. HINNEFELD:** Well -- yeah, it'll be covered.

20 **DR. MAKHIJANI:** I think, I don't know.

21 **MR. HINNEFELD:** It'll be covered.

22 **DR. MAURO:** Yeah, absolutely. Yeah, in fact I
23 think that -- yes, absolutely yes.

24 **DR. WADE:** How long for lunch, Robert?

25 **MR. PRESLEY:** How long does everybody want?

1 **DR. ROESSLER:** Depends on how busy the --

2 **MR. PRESLEY:** You want to try it for 45
3 minutes?

4 **DR. WADE:** Okay.

5 **MR. PRESLEY:** Want to try to come back at 15
6 after 1:00?

7 **MS. MUNN:** Uh-huh.

8 **MR. PRESLEY:** Okay.

9 **DR. WADE:** Okay, we'll break contact with the
10 line, but we'll dial back in at a quarter after
11 and we'll resume the working group session
12 then. Thank you.

13 (Whereupon, a recess was taken from 12:30 p.m.
14 to 1:15 p.m.)

15 **DR. WADE:** ...the working group conference
16 room. We're about to begin. Can I have at
17 least one person identify that you're on the
18 line?

19 (No responses)

20 Anybody out there?

21 **MS. CHANG:** Chia-Chia Chang.

22 **DR. WADE:** Okay, thank you.

23 (Pause)

24 This is Lew Wade again. Could I ask if there
25 are any Board members on the telephone hookup?

1 (No responses)

2 Any Board members with us?

3 (No responses)

4 Okay. Stu, do you -- did -- were you able to
5 get any information as to the oro-nasal
6 breathing status?

7 **MR. HINNEFELD:** Yes, I -- I talked to Jim
8 Neton, who's kind of the lead guy for this and
9 we have actually placed a task order with the
10 task order contractor to research the
11 literature bases for the values in ICRP and
12 other -- what other literature is there about,
13 you know, oro-nasal breathing and the impact of
14 that, with the idea that we should be able to
15 develop some product from the available
16 research about whether an adjustment is
17 warranted or why the adjustment should be made.
18 And that subcontractor -- that contractor's due
19 date on their task is the end of August, so
20 that would be -- now once we receive that,
21 there may still be some work on our part before
22 we feel like we even have a product able to
23 deliver, so that's the time line we're on right
24 now. We haven't set a schedule past the end of
25 August for a deliverable back to the Board.

1 **DR. WADE:** So I mean on the September Board
2 agenda we'll probably touch on science issues,
3 so at a minimum maybe you could give the Board
4 an update on the status of that. If there's
5 something to report, fine. If not, at least,
6 you know, put something on the Board's scope as
7 to what's coming.

8 **MR. HINNEFELD:** I think that'd be a good place
9 for it since Jim would have to give that and
10 not me, so...

11 **DR. WADE:** Okay. Okay, well done, sir -- as
12 always.

13 **MR. PRESLEY:** Are we ready?

14 **DR. WADE:** We're ready.

15 **RESUSPENSION DOSES TO MONITORED WORKERS**

16 **MR. PRESLEY:** Let's start with comment seven,
17 that's at the bottom of page 15.

18 **DR. MAKHIJANI:** Comment seven is (reading)
19 Resuspension doses to monitored workers,
20 especially early re-entry workers, may be
21 underestimated due to the presence of short-
22 lived radionuclides and higher resuspension
23 expected in the days and months after a test,
24 including safety tests. TBD does not specify
25 procedures for estimating environmental

1 internal doses in such cases.

2 Now here again -- let me see what our response
3 is.

4 (Pause)

5 This is your baby.

6 **DR. MAURO:** Partially, yeah. Well, we're in --
7 bear in mind now we're in the -- the SEC time
8 period during atmospheric testing.

9 **DR. MAKHIJANI:** No, I don't think so.

10 **DR. MAURO:** Yeah, early re-entry --

11 **DR. MAKHIJANI:** Yes, yes, yes.

12 **DR. MAURO:** -- so -- so -- so within that
13 context -- and I believe the relevance of this
14 has to do with okay, performing -- the internal
15 aspect of it I guess is a non-issue, if it's
16 during the -- so the only aspect of this would
17 be dealing with external doses --

18 **DR. MAKHIJANI:** No --

19 **DR. MAURO:** No? Okay, help me out.

20 **DR. MAKHIJANI:** -- no, it's that -- it's the
21 safety tests --

22 **DR. MAURO:** Oh --

23 **DR. MAKHIJANI:** -- aspect --

24 **DR. MAURO:** -- oh --

25 **DR. MAKHIJANI:** -- that is remaining, but maybe

1 we covered that already. Did we cover the
2 safety tests aspect?

3 **MR. HINNEFELD:** Well, we -- we spoke briefly
4 about this, but let's -- let's go down this
5 issue a little bit. It sounds like the issue
6 reads to me that you have -- for your -- 'cause
7 it talks about monitored workers, so monitored
8 workers who have bioassay, and the question
9 arises were the bio-- was the bioassay done for
10 the short-lived radionuclides or what -- you
11 know, bioassay was done for a certain set of
12 radionuclides, but there may have been short-
13 lived components -- like for drillbacks -- am I
14 getting this right?

15 **DR. MAKHIJANI:** Right.

16 **MR. HINNEFELD:** -- that wouldn't -- you know,
17 the bioassay tests wouldn't be done for. Is
18 that the nature of the comment?

19 **DR. MAKHIJANI:** Well, actually, you know --

20 **DR. MAURO:** Yeah, that -- the first bullet --
21 yeah, the answer is yes. I'm looking at the --
22 the summary, and that's what it says, that you
23 would -- the relatively short-lived
24 radionuclides such as sodium-24 and neptunium-
25 239 could be missed.

1 **DR. MAKHIJANI:** But I think it relates to the
2 atmospheric testing time.

3 **DR. MAURO:** It is the atmospher-- I guess I
4 didn't -- does the SEC distinguish between
5 exposures from aboveground tests from the
6 nuclear weapons tests versus these other safety
7 tests or --

8 **MR. HINNEFELD:** The -- the SEC -- any -- any
9 internal exposure before the end of 1962 we
10 don't feel reconstruction --

11 **DR. MAURO:** So it doesn't -- doesn't matter
12 whether it's --

13 **MR. HINNEFELD:** -- so if these -- if these
14 safety tests occurred before the end of 1962 --

15 **DR. MAURO:** Okay, so that's not a
16 distinguishing factor then.

17 **MR. HINNEFELD:** -- then we would not be -- we --
18 - not feel we could reconstruct those.

19 **DR. MAURO:** And -- so that being the case, I
20 guess I'm not -- I have to say I'm not quite
21 sure whether we have an issue here.

22 **MR. HINNEFELD:** Okay.

23 **DR. MAURO:** Unless I'm misreading your
24 response, 'cause there is a response here that
25 gets into some -- it mentions of course due to

1 the pending SEC, but then it goes on a little
2 bit further during the safety tests and other
3 radionuclides, and I guess my -- my question
4 is, as long -- as long as it's universal, pre-
5 '63 internal doses are off the table. Then the
6 only issue would be external doses, and that
7 would of course include skin dose and external
8 whole body dose. So maybe we don't have an
9 issue here. Help me out.

10 **DR. MAKHIJANI:** Yeah, I -- I think that you're
11 right. I'm looking at our site profile review,
12 just to see what -- what the detail of the
13 matrix item was. Sometimes it's not clear from
14 the one sentence what you were talking about.
15 And we were -- we were referring to the
16 atmospheric testing period --

17 **DR. MAURO:** Okay.

18 **DR. MAKHIJANI:** -- so the internal dose part of
19 that is -- is a non-issue. I didn't actually
20 go back and verify that.

21 **MR. HINNEFELD:** Yeah, okay.

22 **DR. MAKHIJANI:** So -- and then -- then the
23 other radionuclide question doesn't enter into
24 the safety test question 'cause there you've --

25 **MR. HINNEFELD:** Right.

1 **DR. MAKHIJANI:** -- primarily got plutonium.

2 **MS. MUNN:** So we can say SC&A accepts NIOSH's
3 response?

4 **DR. MAURO:** That's my sense here --

5 **MR. PRESLEY:** For number seven?

6 **DR. MAURO:** -- for number seven. Now I mean I
7 -- because it appears that we're -- the SEC era
8 it's -- covers this and -- and this is all
9 internal.

10 **DR. MAKHIJANI:** Except the safety test question
11 is still sort of pending. In prior items five
12 and six there was this question of resuspension
13 factors and so on, and that's going to be
14 covered. There's a safety test resuspension
15 item under the prior, but not under this.

16 **MS. MUNN:** Not under this.

17 **DR. MAURO:** But -- but this --

18 **DR. MAKHIJANI:** No new item.

19 **DR. MAURO:** I'll say it again. But the safety
20 tests, if performed pre-'63, are captured by
21 the SEC. That's clear. It's only the external
22 portion that's at issue here.

23 **MS. MUNN:** Right.

24 **DR. MAURO:** Okay.

25 **DR. MAKHIJANI:** Weren't there post-'63 safety

1 tests?

2 **MR. HINNEFELD:** There was one -- there was one,
3 on the Tonopah Test Range.

4 **DR. MAKHIJANI:** So -- but that -- that one --

5 **MR. ROLLINS:** That's the one that we said we
6 would -- we would pay attention to.

7 **DR. MAURO:** Okay, got it.

8 **DR. MAKHIJANI:** Yeah, that's why I thought it
9 was still pending from the prior comments.

10 **MR. ROLLINS:** I haven't run into one of those
11 cases yet, but I'm sure I will sooner or later.

12 **MS. MUNN:** Probably.

13 **MR. HINNEFELD:** And this is area 11?

14 **MR. ROLLINS:** No, no --

15 **MS. MUNN:** This is --

16 **MR. ROLLINS:** -- this is NTS.

17 **MR. HINNEFELD:** Okay.

18 **MS. MUNN:** Comment eight?

19 **MR. PRESLEY:** Any comments? Give Arjun just a
20 minute, he's --

21 **DR. MAKHIJANI:** Yeah, I'm just correcting my
22 notes here so.

23 (Pause)

24 1967 EXTERNAL DOSE DATA

25 **MR. PRESLEY:** Okay, issue eight?

1 **DR. MAKHIJANI:** Issue eight -- issue eight is
2 (reading) Use of 1967 external dose data for
3 1963-'66 is not claimant favorable. There were
4 no tests in 1967 with measurable offsite
5 fallout. Relatively short-lived radionuclides,
6 which were likely present in 1963 to '66, would
7 have substantially decayed away by 1967.
8 So this -- NIOSH's response on this is that
9 this would only apply to maximum dose
10 reconstruction for non-compensable cases
11 because everybody else was monitored.

12 **MR. HINNEFELD:** Yeah, I think from the -- from
13 the theoretical basis, since everybody wore a
14 film badge, you wouldn't necessarily include
15 the environmental external 'cause they wore
16 their film badge, it would capture that as well
17 -- you know, all of it, so --

18 **DR. MAURO:** Now for unmonitored workers, you go
19 with Proc. 60, which came out recently. Is
20 that...

21 **MR. HINNEFELD:** Well, for Proc. -- there won't
22 -- our belief is there won't be any unmonitored
23 workers from '63 to '66 because universal
24 badging started in about '57.

25 **DR. MAKHIJANI:** Yeah, external -- external dose

1 --

2 **MR. HINNEFELD:** Externally, right.

3 **DR. MAKHIJANI:** -- data you're -- well, the
4 question I had about -- about the -- assigning
5 a maximum dose, you know, for the purpose of
6 compensability, there should be kind of a -- a
7 scientific rationale for it. And I think the
8 present rationale doesn't address the issue
9 that you had no -- you had no tests with
10 measurable offsite fallout. So '63-'66 was
11 worse than '67, arguably, in terms of external
12 dose. If you're going to assign something, you
13 need to find a way to assign something from the
14 time when there were -- when there were higher
15 doses, rather than from '67. And I think it's
16 the same thing in the next -- in the next
17 comment, actually. Yeah, it's -- the next
18 comment is similar.

19 **MR. HINNEFELD:** Well, the -- I guess the -- one
20 thing we might propose is just changing the
21 instruction to the dose reconstructor if it's
22 after '57 since everybody was badged, that
23 there's no need to put in environmental
24 external. Which would be -- that's to be our
25 normal approach --

1 **DR. MAKHIJANI:** Yeah.

2 **MR. HINNEFELD:** -- and say that, you know,
3 regardless of whether you're doing a maximizing
4 or not, just -- there's just no need to add it.

5 **DR. MAKHIJANI:** Yeah, I -- I actually think
6 that it's better to have something that's
7 scientific -- if you throw in something that's
8 not scientifically defensible and has a problem
9 in it, and then you're removing the dose when
10 you're doing -- it kind of -- it's like the
11 high-five thing, in some ways it gets messy.
12 And if it -- I mean if we had data for 1967 and
13 you were adding it, I would say okay. But in
14 this case you've got a number that I don't --

15 **MR. HINNEFELD:** There's no --

16 **DR. MAKHIJANI:** -- I don't think is very
17 defensible.

18 **MR. HINNEFELD:** But -- and -- but we all kind
19 of -- we all agree, don't we, that there's no
20 particular reason to add environmental external
21 to someone who wears a film badge all the time
22 'cause they get their film badge at Mercury,
23 everybody got their film badge at Mercury
24 starting in '57, I don't see any particular
25 reason to add external environmental.

1 **DR. MAKHIJANI:** I agree with that.

2 **DR. MAURO:** Yeah, but Proc. 60 says starting
3 from '64 you add 123 millirem a year, and I
4 wasn't quite sure what -- where this all -- how
5 that mapped, how that merged. I was reading
6 that. There's a table -- look at tables of --
7 of --

8 **MR. HINNEFELD:** Okay.

9 **DR. MAURO:** -- deal-- dealing with the -- you
10 know, when you -- 'cause -- because whatever
11 the monitored was on the worker, the record
12 some-- for some sites they subtracted -- and
13 you've got to add it back in. I was wondering
14 whether -- I'm -- I'm not sure how mechan--
15 mechanistically it'll work, but it's rare you -
16 - in other words, you've got mon-- you've got a
17 worker, you've got monitor data before workers
18 were monitored, but meanwhile I read Proc. 60,
19 it starts in '64 or '63 -- '63, and it gives --
20 here's -- I think the number was 123 millirem
21 each year --

22 **MR. HINNEFELD:** For NTS?

23 **DR. MAURO:** -- for NTS.

24 **MR. HINNEFELD:** Okay.

25 **DR. MAURO:** And I wasn't quite sure what, you

1 know, this -- given this conversation, how that
2 sort of comes together. I may have it wrong,
3 but I seem to recall that.

4 **MR. ROLLINS:** But that was captured -- what
5 we're saying is yes, that -- that is some
6 reasonable approximation of the ambient at the
7 site --

8 **DR. MAURO:** Yes, sure, 123 millirem a year.

9 **MR. ROLLINS:** -- but -- but what we're saying
10 is that was captured by the film badge.

11 **DR. MAURO:** Okay, and there's no need to add
12 that back in.

13 **MR. ROLLINS:** Correct.

14 **DR. MAURO:** Okay, it wasn't apparent that that
15 was the situation.

16 **MR. ROLLINS:** Originally those numbers were
17 developed to add in for those people that were
18 unmonitored, but since everybody's monitored
19 since '57, there's no need to do that.

20 **DR. MAURO:** Okay.

21 **DR. MAKHIJANI:** Yeah, and before '56 period,
22 would you retain that for the before '56 period
23 for the non-compensable cancers or how would
24 you do that? Oh, no, so we're just talking '63
25 -- sorry, I don't know what I was --

1 **DR. MAKHIJANI:** Sorry, we're talking about the
2 '60s. No, I -- I agree that, you know, if it's
3 only to be assigned for -- I don't know if John
4 agrees so it's sort of real time resolution
5 here and there doesn't seem to be any -- any
6 reason to add in a dose for --

7 **DR. MAURO:** No, I --

8 **DR. MAKHIJANI:** -- unmonitored people --

9 **DR. MAURO:** Right.

10 **DR. MAKHIJANI:** -- for uncompensable cases, and
11 then if you have to do it, then you take it
12 away, it just makes -- I think it makes
13 everything much more messy.

14 **MR. PRESLEY:** So SC&A agrees with --

15 **DR. MAURO:** Yes.

16 **DR. MAKHIJANI:** Well, I think -- I think --

17 **MR. HINNEFELD:** But this is our -- response
18 hasn't been --

19 **DR. MAKHIJANI:** -- this response would have to
20 be changed.

21 **MR. HINNEFELD:** We are amending our response
22 here to say that we'll change the instructions
23 to the dose reconstructors just to say that
24 from -- for the universal badging period when
25 people badged and we've gotten information

1 about what they (inaudible) with control
2 badges, et cetera, so it's -- there is no need
3 to add that environmental at any point from the
4 universal, and just make that the general
5 instruction, regardless of dose reconstruction.

6 **DR. MAURO:** When I read the site profile on
7 this during that time period, apparently the
8 mon-- though universal, there was an awful lot
9 of problems with the degradation of the badges
10 from heat, humidity and their being destroyed -
11 - in other words, there wa-- and -- there was a
12 lot of that. So though there was universal
13 badging, there might be an awful lot of workers
14 whose badges were not readable and usable.

15 **MR. HINNEFELD:** Well, I think -- another issue
16 -- I mean we're getting in -- we'll get into
17 issues I think in a -- later in your report
18 about the dosimetry record --

19 **DR. MAURO:** Yes.

20 **MR. HINNEFELD:** -- and the quality of the
21 dosimetry record. And so we can maybe --

22 **DR. MAURO:** That's the -- we'll deal with that
23 then?

24 **MR. HINNEFELD:** -- capture that at that point.

25 **DR. MAURO:** Sure, okay. Okay. But given that

1 **DR. MAKHIJANI:** Comment nine is pretty similar.
2 There's no environmental -- (reading) Lack of
3 environmental dose -- external dose data for
4 '68 to '76 is puzzling. TBD has not specified
5 an approach estimating external environmental
6 dose for this period. Venting in the 1968-'70
7 period likely made external dose in that
8 period, and possibly beyond, higher than 1967.
9 So your response was the same, and I guess the
10 resolution would be the same?

11 **MR. HINNEFELD:** That's what I believe would be
12 the resolution is that external environmental
13 doesn't need to be added back anyway.

14 **MS. MUNN:** It's captured by the badge.

15 **MR. PRESLEY:** All right.

16 **DR. MAURO:** You're going to have to help me out
17 a little bit. Now -- okay, we -- what we're
18 saying is there's this time period where you
19 don't have TL-- you don't have film badge
20 readings.

21 **DR. MAKHIJANI:** Environmental TLD.

22 **DR. MAURO:** Right, these are -- these are
23 environment-- these are workers in -- that --

24 **DR. MAKHIJANI:** No, you have the worker data,
25 but there's no environ-- like the envir-- area

1 -- area monitoring external dose data are
2 missing.

3 **DR. MAURO:** Okay.

4 **DR. MAKHIJANI:** And -- and we don't know why.

5 **DR. MAURO:** Okay. But then when I go to Proc.
6 60, I see the standard hundred millirem -- I
7 think it was 123 millirem per year. But the
8 issue here is this business of venting, which
9 could be transient situations where exposures
10 could be --

11 **DR. MAKHIJANI:** Not --

12 **DR. MAURO:** Help me out a little bit, maybe I'm
13 misunderstanding. In other words, I don't see
14 Proc. 60 solving the problem.

15 **MR. HINNEFELD:** But I mean if you're -- a
16 venting -- if the person's badged, will be --

17 **DR. MAURO:** You've got it.

18 **MR. HINNEFELD:** -- you know, will be measured.

19 **DR. MAURO:** Right.

20 **MR. HINNEFELD:** And the --

21 **MR. PRESLEY:** I mean this is in the 1960s.

22 **MR. HINNEFELD:** -- the approach is that, you
23 know, we have a badge record for each person.

24 **DR. MAURO:** Okay, so lack of environmental but
25 you've got the badge -- okay.

1 **MR. HINNEFELD:** Okay?

2 **DR. MAURO:** Okay, that's...

3 **DR. MAKHIJANI:** So the external -- the internal
4 dose would be an issue, but not -- not the
5 external dose.

6 **MR. HINNEFELD:** You mean from the venting?
7 Yes.

8 **DR. MAKHIJANI:** Yes.

9 **PRE-1963 EXTERNAL ENVIRONMENTAL DOSE**

10 **MR. PRESLEY:** Okay, comment ten?

11 **DR. MAKHIJANI:** (Reading) TBD does not provide
12 any guidance for pre-1963 external
13 environmental dose. Issues relating to
14 unmonitored workers, as well as time of entry
15 into contaminated areas, could be important.
16 And I think this is sort of captured by the SEC
17 petition, except --

18 **DR. MAURO:** This is external --

19 **MR. HINNEFELD:** Well, this is external dose.

20 **DR. MAURO:** This is external, though.

21 **DR. MAKHIJANI:** Yeah, so from '57 on, you're
22 okay.

23 **MR. HINNEFELD:** From '57 on we think we're okay
24 with -- with the badge record.

25 **DR. MAKHIJANI:** So this is the same as the

1 prior comment, and then you need a coworker
2 model for '56 --

3 **MR. HINNEFELD:** Yes.

4 **DR. MAKHIJANI:** -- up to '56.

5 **DR. MAURO:** We agree to that.

6 **MR. PRESLEY:** Through '56?

7 **DR. MAKHIJANI:** It's not -- it's not there in
8 the response --

9 **MR. HINNEFELD:** It's not there now, but we
10 agree we need it. Right?

11 **DR. MAKHIJANI:** -- but --

12 **MR. HINNEFELD:** Isn't that right?

13 **MR. PRESLEY:** Need a coworker what now?

14 **DR. MAURO:** For the worker model -- well, for
15 pre-'57.

16 **MR. HINNEFELD:** Coworker or source term or
17 something like that.

18 **DR. MAURO:** Some -- some way to capture --

19 **MR. HINNEFELD:** Some method, yeah.

20 **DR. MAURO:** -- plausible upper bounds.

21 **MR. HINNEFELD:** Coworker -- coworker is
22 preferred, source term might be feasible. Area
23 survey might be -- survey data.

24 **MR. ROLLINS:** There was personnel data back
25 then.

1 **MR. PRESLEY:** Up to --

2 **MR. HINNEFELD:** '57.

3 **DR. MAURO:** 1957.

4 **MR. PRESLEY:** -- 1957.

5 **DR. MAURO:** I guess that's '51 to '57?

6 **MR. HINNEFELD:** Yeah.

7 **DR. MAURO:** That's important.

8 **MS. MUNN:** This is going to require a change to
9 the TBD.

10 **DR. MAURO:** So far, of all the issues we've
11 discussed -- I mean just to give a little
12 commentary -- I think that the point being made
13 -- some of these internal issues that we -- you
14 know, some of the other issues we talked about
15 before, but this sounds like a big one. That
16 is, these people -- in theory during those time
17 periods -- could have experienced some
18 substantial exposures. And the co-- how you
19 come at the coworker model --

20 **MR. HINNEFELD:** Right.

21 **DR. MAURO:** -- is going to be very important.
22 In other words, if you're saying where's the
23 big ticket item here that could really have an
24 effect on dose reconstruction, here it is.

25 **MR. HINNEFELD:** And this is -- yeah, this is

1 pre-'57 external, we really --

2 **DR. MAURO:** Pre-'57 external.

3 **MR. HINNEFELD:** -- want to try to come up with
4 a way to do that.

5 **DR. MAURO:** Yeah, this is a hot one.

6 **MR. PRESLEY:** I put down '51 through '57. Is
7 that correct?

8 **MR. HINNEFELD:** Yeah -- '56.

9 **DR. MAURO:** Yeah --

10 **MR. PRESLEY:** All right, it's up to -- should
11 be '51 through '56, right?

12 **MR. HINNEFELD:** Correct.

13 **MR. PRESLEY:** Through '56.

14 **DR. MAKHIJANI:** Mr. Presley, I think it might
15 be somewhere in between -- it might be
16 something like April --

17 **DR. MAURO:** Yeah, it says April 1st '57 is the
18 cutoff point. That's what the response says,
19 so -- so some -- so before April 1st, 1957 is
20 when there's a lack of data.

21 **MR. PRESLEY:** Okay. Anything else on comment
22 ten then?

23 (No responses)

24 Okay, comment 11?

25 **CORRECTION FACTORS**

1 **DR. MAKHIJANI:** (Reading) Correction factors
2 for external environmental dose due to geometry
3 of organ relative to badge, and angular
4 dependence of the dose conversion factor need
5 to be developed.
6 NIOSH split this into three -- four parts, I
7 didn't remember there were four parts. The --
8 on the first part, in relation to geometry, the
9 -- the location of the badge versus the organ
10 for which calculations are done, NIOSH agreed
11 to develop correction factors for lower torso
12 organs, and we agree with that. And also
13 agreed that the geometry -- other geometry
14 factors, angle of incidence and dose conversion
15 factor needs to be fixed. I think there's been
16 an extensive discussion about this before in
17 relation to the procedures, so we also agree
18 with that.
19 And NIOSH also agreed time -- time of entry
20 into contaminated zone is important. This is
21 partly covered by a prior discussion about the
22 radionuclide list, so this is a repeat of that.
23 I -- I had one question about the NIOSH
24 response to 11c, which was when minimizing or
25 provid-- the last -- second last sentence in

1 11c, which is (reading) When minimizing or
2 providing a best estimate -- providing a best
3 estimate dose, the photon energy range
4 assumption is 24 percent in the 30 to 250 keV
5 range and 75 percent greater than 250 keV.
6 Now I didn't see where the 25/75 split came
7 from and why it should be regarded as claimant
8 favorable. Is there some sort of fission
9 product analysis basis for that, or...

10 **MR. ROLLINS:** Well, four years ago I remember
11 doing a little bit of work using the Harry
12 Hicks* documents that -- time dependence, and
13 that may be where that came from.

14 **DR. MAURO:** It's a very tractable issue, but as
15 -- whether or not that's correct or not, I
16 can't speak to it, but the information is out
17 there in the literature to determine if that's
18 correct.

19 **MR. ROLLINS:** Now from a IREP point of view, we
20 could go 100 percent greater than 250. That
21 would be absolute minimizing --

22 **DR. MAKHIJANI:** Yes.

23 **MR. ROLLINS:** -- as far as energy distribution
24 is concerned.

25 **DR. MAKHIJANI:** Right.

1 **MR. ROLLINS:** Now my opinion is it would make
2 very differen-- it would make very little
3 difference in compensability on a case that's
4 from the actual cases. So rather than doing a
5 huge study of this, I would -- I would just
6 say, for minimizing, go to 100 percent rather
7 than 250, and then there's no issue.

8 **DR. MAKHIJANI:** Yeah -- no, for minimizing I
9 think it's all right. I think that's -- 100
10 percent greater than 250's okay. It's sort of
11 the best estimate -- is your best estimate
12 claimant favorable with a 25 to 75 split, and I
13 think that does need some kind of -- a Hicks
14 table justification would be fine, but -- but I
15 think you do need to show that -- that -- that
16 you're covering all reasonable times of entry
17 with that split, and that you remain claimant
18 favorable in a best estimate dose. I'm not
19 saying it's wrong, I just think -- I just think
20 that it needs some -- some technical basis,
21 which -- which isn't -- that I don't see right
22 now.

23 **MR. HINNEFELD:** All right, we'll provide that.

24 **DR. MAURO:** Am I correct, the -- the lower the
25 energy distribution, the more important this

1 issue of angle inci-- angle of incidence and
2 badge location becomes, because the difference
3 -- the effect of angle of incidence is much
4 more profound when -- and the -- and the --
5 where the badge is, relative to the organ of
6 concern, if you're dealing with lower energy
7 photons, so they -- they --

8 **MR. HINNEFELD:** We don't have our external
9 dosimetry expert in the room --

10 **DR. MAURO:** I don't -- I seem to recall it came
11 up on another subject.

12 **MR. ROLLINS:** Jack was on the phone.

13 **MR. HINNEFELD:** Got a bunch of internal
14 dosimetrists -- is Jack on the phone?

15 **MR. ROLLINS:** He was.

16 **MR. HINNEFELD:** Jack, are you on the line?

17 (No responses)

18 Okay. I don't know -- I don't know for sure.
19 Film was kind of a funny thing, and low energy
20 photon over-responds --

21 **DR. MAURO:** It over-responds, but then you --
22 yeah.

23 **MR. HINNEFELD:** -- and then when -- and even
24 when you depart from a 90-degree angle on film,
25 since the track -- the photon track through the

1 emulsion is longer, you actually have a higher,
2 you know, response to the film for a little bit
3 until -- unless you can end at that. So film's
4 a funny thing in terms of how it reacts to the
5 photons -- photon energy. TLD, I don't know if
6 you'd have the same situation.

7 **DR. MAURO:** I -- I guess the point that is when
8 -- when we look into this matter of energy
9 distribution and what's claimant favorable and
10 what's not, I think it's confounded by the
11 issues related to angle of incidence and where
12 the fil-- where the organ -- target organ is
13 versus where the film badge is worn. They sort
14 of all play on each other in -- in ways that
15 right now I guess is not self-evident.

16 **MR. HINNEFELD:** Right. Right.

17 **MR. FIX:** This is Jack Fix --

18 **DR. MAURO:** Good.

19 **MR. FIX:** -- calling in.

20 **MR. HINNEFELD:** Jack, could you hear our
21 discussion about --

22 **MR. FIX:** Yeah, I'm sorry, I had trouble with
23 my mute button. I had it on. Yes, I did, and
24 it is -- it is problematic, as this discussion
25 indicated, and that's why laboratory studies

1 were done in which dosimeters placed on a
2 anthropomorphic phantom were rotated in
3 selected beams. It was done here at Hanford
4 with the different historical dosimeter
5 designs. All of the Hanford designs were
6 placed on phantoms and rotated in selected
7 beams. Those -- unfortunately, those
8 particular beams were a little higher energy
9 than -- so they were 100 keV and higher, and
10 the International Agency for Research on
11 Cancer, when they did their 50-country study in
12 a paper that should be coming out before long,
13 they did a similar study in which they placed
14 dosimeters -- personnel dosimeters, in this
15 particular case, ten widely-used designs used
16 throughout the world, and they did laboratory
17 studies at the Medical Radiation Physics
18 Laboratory for the International Agency for
19 Atomic Energy. And both of these studies had
20 the same results, and that is for the energies
21 that were used and then lowest energy used
22 there by the international study was 80 --
23 essentially a narrow X-ray beam of around 80
24 keV effective. And all this showed is that the
25 -- and they used isotropic and rotational as

1 well as anterior/posterior orientation, and all
2 these showed that the film would significantly
3 over-respond to the delivered personal dose
4 equivalent for that geometry. For example, in
5 a rotational geometry, that the dosi-- the film
6 dosimeter -- interpretation greatly
7 overestimated -- significantly overestimated,
8 say by about a factor of three -- the actual
9 dose.

10 Now there's still concern at low energies. You
11 know, like say 17 or -- but a-- but again one
12 has to pay a great deal of attention to the
13 actual exposure scenario because as the pho--
14 as the energy gets lower, non-homo-- non-
15 uniform exposures are significant, but the
16 range is so much lower so usually you're
17 worried about people that are working directly
18 with -- with the material.

19 So it's complicated and that's why we did the
20 laboratory studies, and we didn't -- it wasn't
21 feasible to cover all energies, but that's what
22 the results showed.

23 **MR. HINNEFELD:** So with respect to our response
24 on the apportionment of photon energies, which
25 is where we started, it -- it may be well --

1 that apportionment may well affect angular
2 adjustment and those type of things, and we
3 will I think go ahead and provide some sort of
4 backup for a best estimate split that's
5 something -- you know, some sort of best
6 estimate --

7 **DR. MAURO:** It sounds like you have the
8 wherewithal and ability to --

9 **MR. HINNEFELD:** Yeah, I think there's --

10 **DR. MAURO:** -- to -- to run this to ground.

11 **MR. HINNEFELD:** I think there's data out there
12 probably that will allow us to do it.

13 **MR. PRESLEY:** So y'all are going to provide an
14 explanation of the 25/75 split or a best
15 estimate split.

16 **MR. HINNEFELD:** Yeah, some sort of best
17 estimate split.

18 **MR. PRESLEY:** Okay.

19 **DR. MAKHIJANI:** And then the last item in 11 is
20 this data integrity issue, is sometimes workers
21 did not wear their badges when the quarterly
22 dose limit was near three rem. Now that's the
23 same as a full comment, the comment number 20,
24 and we concurred there or here, but the NIOSH
25 response that they can't find a way of

1 retrieving the missed data, and since -- and
2 you can't do core dosimetry, the -- the basis
3 of the response that NIOSH will investigate
4 this, along with DOE complex sites where
5 similar claims have been made, I -- I disagreed
6 with that approach of investigating this. You
7 know, there -- there are -- there've been of
8 course statements made about Rocky Flats and
9 other sites, and I'm aware of that. But in
10 this particular case, you had very senior
11 health physics officials who personally have
12 testified to what was going on, so -- so I
13 don't think it's sort of like an affidavit or -
14 - I think it's in a completely different class.
15 It's in a class like when you brought -- I
16 forget her name, the -- the paper by the person
17 who was involved in the monitoring at Bethlehem
18 Steel, or you had brought Mr. Breslin to say
19 how they did things when they actually did the
20 monitoring. It's -- it's of that -- so it's
21 truly -- you know, I'd say almost a report
22 prepared by an expert.

23 **MR. HINNEFELD:** Right.

24 **DR. MAKHIJANI:** And so I actually think that
25 you can't put this particular thing in the same

1 box and say --

2 **MR. HINNEFELD:** As Rocky Flats.

3 **DR. MAKHIJANI:** -- we -- as we've been
4 approaching Rocky Flats where you take an
5 affidavit, you go to the worker's record and so
6 on. Here you've got somebody who was there
7 throughout the testing period, and it was
8 corroborated independently by people who are
9 still there who are part of the DOE and -- or
10 DOE contractor system, and so it had two
11 independent corroborations from pretty senior
12 health physics people. So I don't think this
13 is the right way to deal with it.

14 **MR. HINNEFELD:** Well, there's another way that
15 we're looking at dealing with this, and it
16 really depends upon can we get the dataset in a
17 good re-- in a good fashion, you know, a good
18 robust dataset, because a distribution of the
19 exposures, if you have all the -- all the
20 readings, exposure shows you some particular
21 distribution. And if there was a practice of
22 shielding your badge so that you wouldn't
23 exceed a limit, then at the top end of your
24 distribution, instead of carrying out, it
25 should roll over because people were not -- you

1 know, they were not badging themselves and so
2 they wouldn't get six rem, they're going to
3 stay down here at three.

4 **DR. MAKHIJANI:** Yeah.

5 **MR. HINNEFELD:** Okay. So in that sense, there
6 may be a way to reproduce those. You know, to
7 produce that distribution, that probability --
8 or that -- yeah, probability distribution,
9 observe that rollover and -- and -- and
10 extrapolate how much of an adjustment is
11 necessary to these people who were in this
12 position. And then that could theoretically be
13 applied to people who have significant dose and
14 therefore were legitimately in those candidates
15 who may be extending -- who may be exceeding.
16 So there'd be some threshold probably you would
17 choose to apply this adjustment to, something -
18 - people above this dose number would do it.
19 So far, this is theoretical. Okay? And do --
20 is the dataset complete? I don't know.

21 **DR. MAURO:** So -- so we have a worker and --
22 the scenario goes like this. He does not want
23 to exceed three rem recorded.

24 **MR. HINNEFELD:** Right.

25 **DR. MAURO:** It's not in his interests, let's

1 say in theory his fin-- economic interests.

2 **MR. HINNEFELD:** Right.

3 **DR. MAURO:** Now he's badged weekly, monthly or
4 quarterly? If it's quarterly, then it becomes
5 almost like a non-starter. I mean if it's
6 quarterly, it's --

7 **MR. HINNEFELD:** Yeah, you --

8 **DR. MAURO:** So it would have to be at least
9 monthly, I guess.

10 **MR. HINNEFELD:** It'd probably be at least
11 monthly, and I don't know -- do you remember
12 the badging frequencies, Gene, at NTS, how
13 often they exchanged badges?

14 **MR. ROLLINS:** Monthly.

15 **MR. HINNEFELD:** Monthly.

16 **DR. MAURO:** So in other words -- so the idea
17 being all right, the worker's -- sees his
18 exposure month number one and he sees -- uh-oh
19 --

20 **MR. HINNEFELD:** Oh, I'm over a rem.

21 **DR. MAURO:** -- wait a minute, it's starting to
22 climb month number two -- right? -- so by the
23 time he's -- he's approaching this quarterly,
24 he say I'm running into trouble and you're
25 saying that -- so all of a sudden, the last

1 reading of his quarterly sequence would all of
2 a sudden drop off the table.

3 Now, it could drop off the table for two
4 reasons. He did this --

5 **MR. HINNEFELD:** Right.

6 **DR. MAURO:** -- or he was taken off that job --

7 **MR. HINNEFELD:** Right.

8 **DR. MAURO:** -- and put someplace else because
9 they didn't want him to exceed his quarterly
10 levels --

11 **MR. HINNEFELD:** Right.

12 **DR. MAURO:** -- LARA practice. My guess is if
13 the latter were the case, the records should
14 show that. That is that yes, he was
15 reassigned. Someplace there's a --

16 **MR. HINNEFELD:** There's some -- be some
17 personnel record or something.

18 **DR. MAURO:** -- some documenta-- the personnel
19 documentation that he was taken off, put in --
20 because of this. If that doesn't exist, then
21 we have a situation where this might be --

22 **MR. HINNEFELD:** Right.

23 **DR. MAURO:** -- and you're saying that it --
24 under those circumstances, it's tractable, and
25 then you would just -- if that were the case,

1 you -- you would -- if you had a real person
2 where you thought this might be the case, you
3 would just extrapolate, assume that he --
4 whatever dose he got in month one, month two,
5 month three --

6 **MR. HINNEFELD:** Well, actually what we probably
7 would expect to do would be --

8 **DR. MAURO:** One -- one -- the two months in a
9 row, then the third one.

10 **MR. HINNEFELD:** Well, what we would expect to
11 do probably would be have some adjustment
12 factor based on the total distribution -- beta
13 distribution, say -- see, it should go
14 straight, it -- it lays over at the top, that
15 means we're going to conclude that that meant
16 they did this. And -- and rather than seek
17 additional individual records about individual
18 assignments on the hope that we would see
19 somebody was reassigned from a forward area
20 after two months and -- and do that, we'd
21 probably make this a general application to
22 people who fit the category of highly exposed
23 and -- and just make that a general adjustment.
24 That would -- I'm just -- and we're speaking
25 here hypothetically now 'cause like I said, so

1 far all we've done is thought that this might -
2 - this might be a way to do that.

3 **DR. MAURO:** A way to track it down.

4 **MR. HINNEFELD:** This might be to do this and
5 that there might -- you know, this -- this may
6 be a solution. And we want to be real -- you
7 know, pretty careful about saying that we're
8 going to make a lot of fine distinctions -- on
9 Joe Smith we're going to treat it this way and
10 Bob Smith we're going to treat this way --

11 **DR. MAURO:** You may be universal.

12 **MR. HINNEFELD:** -- and Joe Jones we're going to
13 treat --

14 **DR. MAURO:** How do you do it annually then?
15 Let's say -- yeah, I guess I didn't quite
16 understand. Say you've got this -- you have
17 this worker --

18 **MR. ROLLINS:** Let me -- let me make an
19 observation.

20 **DR. MAURO:** Yeah.

21 **MR. ROLLINS:** Just in general -- and this is --
22 this is one thing the workers keep talking
23 about, about how nobody ever got any dose out
24 there. Well, the reason they didn't get any
25 dose, for the most part, is they weren't

1 exposed to very much. There's -- is an
2 exception to that, and the only cohort group
3 that we see out there that ever got close to
4 limits were those that were involved in the
5 reactor experiments -- and the cleanup of the
6 reactor experiments, because they sent those
7 people out there to pick up the pieces and they
8 -- they ran their doses up pretty high. And so
9 that's a fairly small group of people. It's a
10 handful of people, but they're the only ones
11 that we see that ever had anything approaching
12 any kind of limit.

13 **DR. MAURO:** But then we get this '51 to '57
14 time period where we don't have the badging, so
15 that's --

16 **MR. HINNEFELD:** Well, that's problematic in
17 another sense.

18 **DR. MAURO:** I know, but you see, that
19 confounded --

20 NOTE: Multiple speakers commented simultaneously.

21 **DR. MAURO:** But I think they're related. I
22 mean it's -- doesn't that confound --

23 **MR. HINNEFELD:** Well, this would be a -- well,
24 I don't know if it's a -- I think it's a
25 related -- it's a -- it's a different issue,

1 but it -- and it would maybe -- if people
2 weren't badged and they weren't hiding the
3 badges. So to me it's kind of a separate issue
4 --

5 **DR. MAURO:** Oh, you said you had no badges, of
6 course. What am I talking about?

7 **MR. HINNEFELD:** So if you're -- but during the
8 badged period it would seem to me that it may
9 be solvable if the -- if the dataset is
10 complete enough, if we can get that and it
11 lines up okay. You know, we've had occasions
12 when we felt we could line the data up okay and
13 -- and the -- when you start looking at
14 individual reads, it just doesn't -- individual
15 read data just doesn't look that -- you know,
16 that consistent internally, you're not really
17 sure what you're looking at on some of these
18 databases. A lot of annual totals look good --
19 well, annual totals okay, but trying to put --
20 you know, build up those annual -- you know,
21 figure out what quarter it was available or
22 what the monthlies were to add that total, you
23 start looking at the database, it's not -- it's
24 kind of hard to figure out which was the
25 monthly result. So there may -- we may run

1 into a situation like that where we can't get
2 these monthlies in good order and -- and then
3 there's still an open question if there's
4 something you can do or not. But at the moment
5 we're hopeful that we could make some sort of
6 adjustment like that for these people who
7 intentionally took their badges off to avoid
8 exceeding a -- some sort of limit, you know,
9 the three rem or administrative limit or
10 something like that, so we are hopeful of that.
11 But right now, like I said, it's -- it's
12 theoretical right now, so I'd have to get up
13 with Dr. Neton about exactly, you know, are we
14 anywhere on that or anything. I think that may
15 be another subcontractor task order.

16 **DR. ROESSLER:** Let me make sure I understand
17 this. It seems different now than when I was
18 reading this. When I was reading this I had
19 the impression that because people hid their
20 badges a lot during a certain period of time
21 that -- that this was probably impossible. But
22 it seems like there were not many people in
23 that category where the doses would reach that
24 limit, and now from what you're saying,
25 theoretically you can -- because they wouldn't

1 hide their badges until they got to the end of
2 the quarter, that maybe the first two monthly
3 readings would be valid and you can take from
4 that -- is that what you're --

5 **MR. HINNEFELD:** It -- it could be, but we
6 wouldn't -- we wouldn't think about using that
7 person's first two monthly readings and then --
8 and then extrapolate that to the third. I
9 don't know that that's -- 'cause that's a
10 pretty fine structure for dose reconstruction.
11 Probably what we would do is identify the
12 likely candidates who probably fit in this
13 category, and provide an adjustment to their
14 recorded dose --

15 **DR. ROESSLER:** For those candidates.

16 **MR. HINNEFELD:** -- with the assumption that
17 they participated in this practice. So that's
18 probably an approach that is, you know,
19 implementable if in fact there is -- the data
20 provide a basis for it, which is not -- which I
21 don't know today.

22 **DR. ROESSLER:** And I have one more question.
23 Now this time period where Jay Brady talks
24 about -- and the others talk about they're
25 hiding the badges, what -- what is that time

1 period that -- that this allegedly happened?

2 **MR. HINNEFELD:** He said it may have continued
3 into -- what, about 1970 or --

4 **DR. MAKHIJANI:** Jay Brady thought it went into
5 the mid-'60s or about the time -- there's some
6 -- there's some doubt about how long this may
7 have continued, mid-'60s to maybe early '70s at
8 the latest.

9 **DR. MAURO:** I think it was linked to the
10 conversion of the film badge into part of the
11 security badge.

12 **DR. ROESSLER:** Oh, yeah, --

13 **DR. MAKHIJANI:** Brady thought it had been --

14 **DR. ROESSLER:** -- where their ID was --

15 **DR. MAURO:** Where their ID was locked up with
16 their film badge.

17 **DR. ROESSLER:** Okay.

18 **DR. MAKHIJANI:** Then it became a minimal
19 problem after the --

20 **DR. ROESSLER:** So that's the potential period.

21 **DR. MAKHIJANI:** Yes, maybe late '60s, some--
22 it's somewhere in there. We haven't been able
23 to get a good answer.

24 **DR. MAURO:** Keeping the thought process going,
25 so -- so let's say you go through this process

1 with the post-'57 dataset and you come up with
2 these fixes for this subcategory of workers,
3 which will be these high-end class of workers.
4 So now you've built what you would call a
5 fairly robust dataset for workers post-'57,
6 taking into consideration perhaps some strange
7 practices. All right. Now you've got that.
8 Now you want to work your way backward and say
9 okay, we're going to use that information
10 somehow to reconstruct doses to -- external
11 doses to workers from '51 to '57. Now I guess
12 you haven't started -- I'm trying to visualize
13 -- so what you've got now is this very large
14 population of badged workers post-'57, and the
15 vast majority of the -- and this almost brings
16 us back to Y-12 and pre-'61. The vast majority
17 of them are going to be -- have low doses or no
18 doses --

19 **MR. HINNEFELD:** Right.

20 **DR. MAURO:** -- except for some small subset,
21 perhaps the ones that were involved in the
22 reactor testing program are going to be --
23 you're going to have almost like a binom--
24 bimodal distribution -- some -- a group of
25 workers that are up here and then the rest are

1 going to be down in this low end.

2 Now, confronted with that set of information,
3 then you ask yourself okay -- but now we have
4 this other group of workers, who knows how many
5 there are, that was from '51 to '57, and
6 somehow we want to build a bridge from that --
7 between the data, recognizing that the -- the
8 data that was compiled from -- I'm sorry, I'm
9 thinking through the problem -- I thought I was
10 trying to solve it. From '57 to '62 is
11 aboveground testing --

12 **MR. HINNEFELD:** Yes.

13 **DR. MAURO:** -- so that becomes the data of
14 greatest interest because that's the data that
15 -- 'cause there's a lot of testing went on and
16 that -- so -- and you -- one could argue that
17 the nature of the exposures that took place
18 from '57 to '61, the actual monitored data,
19 probably represents the most representative set
20 of data that might apply to '51 through --
21 through '57. And now would you work off the
22 full distribution? So now we have a worker
23 that is in the early years. Is it -- would it
24 be your inclination to work off the full
25 distribution of let's say that dataset, the '57

1 to '61 dataset, or work off the upper 95th
2 percentile as being your surrogate?

3 **MR. HINNEFELD:** I haven't even thought about it
4 yet, but certainly we'd have to be concerned
5 about -- you know, use of -- use of full
6 distribution in coworkers is -- we really only
7 use like mid-point for people who we're pretty
8 confident were unexposed, so if we had, you
9 know, job classes that we would consider
10 unexposed or -- or at least only moderately
11 exposed --

12 **DR. MAURO:** 'Cause you -- you could see how
13 important that would be --

14 **MR. HINNEFELD:** Yeah.

15 **DR. MAURO:** -- because if you go with the full
16 distribution, you capture this large number of
17 workers who weren't exposed.

18 **MR. HINNEFELD:** Who weren't exposed, right.

19 **DR. MAURO:** If you go with the 95th percentile,
20 you're going to be working off this upper --

21 **MR. HINNEFELD:** There was -- there was some
22 personnel monitoring data before '57.

23 **DR. MAURO:** Oh, okay.

24 **MR. HINNEFELD:** Then there's universal
25 monitoring after '57. There is some personnel

1 monitoring before '57, but you know, we haven't
2 solved the nut -- you know, we haven't solved
3 the issue in here today yet about pre-'57.

4 **DR. MAURO:** We're going to have another pre--
5 we're going to have another Y-12 pre-- 'cause
6 we haven't done that yet, as you all know, but
7 that's going to be another place where this is
8 exactly the same situation, and the -- the
9 stra-- and I guess we're going to be -- quite
10 frankly, I guess we'll be marching forward
11 pretty soon with regard to the Y-12 issue. I
12 think how that resolves -- is resolved and
13 where that ends up is probably going to be a
14 very good precedent for the strategy that
15 ultimately is adopted here 'cause --

16 **MR. HINNEFELD:** I suspect --

17 **DR. MAURO:** -- it seems to me that they're very
18 similar.

19 **MR. HINNEFELD:** I suspect it is, right. I
20 suspect it is.

21 **MR. PRESLEY:** So we can say that NIOSH will
22 provide an adjusted dose for or to the workers
23 that supposedly hid their badges? Is that how
24 you'd say that?

25 **MR. HINNEFELD:** Yeah.

1 **MR. PRESLEY:** I mean that's --

2 **MR. HINNEFELD:** Some sort of appro-- we're gong
3 to work on an approach.

4 **MR. PRESLEY:** Okay.

5 **MR. HINNEFELD:** You know, I can't promise
6 success --

7 **MR. PRESLEY:** Yeah.

8 **MR. HINNEFELD:** -- but we're -- we intend to
9 work on an approach to do that.

10 **MR. PRESLEY:** Okay.

11 **MS. MUNN:** Isn't it a shame we can't have a
12 sense of Congress as to how they feel about
13 workers who might have shielded their badges
14 and now issue claims for compensation. I'd --
15 I'd like to hear the Congressional sense when
16 that --

17 **MR. HINNEFELD:** You might -- you might get 535
18 -- maybe more.

19 **MR. PRESLEY:** Okay. Any more comments on 11?

20 **MS. SCHUBERT:** Could a person on the phone ask
21 a question?

22 **DR. WADE:** Surely.

23 **MS. SCHUBERT:** I just was wondering, I just got
24 on -- this is Sandi Schubert from Senator
25 Reid's office -- and I heard a woman mentioning

1 they'd like a sense of Congr-- a sense from
2 Congress as to what they want in a particular
3 arena. I didn't actually hear what that arena
4 was.

5 **MS. MUNN:** This is Wanda Munn, and I was being
6 facetious. I was sim-- I was not expecting
7 Congress to respond at all.

8 **MS. SCHUBERT:** Is there any way to find out
9 what the topic was, or if there's notes on this
10 --

11 **MS. MUNN:** Oh, yes. We had been discussing the
12 case of workers who may have deliberately
13 shielded their badges in order to circumvent
14 any level of exposure that would require them
15 to change jobs or to not go to work.

16 **MS. SCHUBERT:** Thank you very much, I
17 appreciate that.

18 **MS. MUNN:** Yes.

19 **RADON DOSES IN G-TUNNEL**

20 **MR. PRESLEY:** Arjun, you want to talk about
21 comment 12?

22 **DR. MAKHIJANI:** Oh, yeah. Comment 12 is
23 (reading) Radon doses in G-tunnel are not
24 claimant favorable. Gravel Gertie radon doses
25 are not discussed, and could be substantial.

1 Site status of Gravel Gertie workers needs
2 clarification.

3 NIOSH's response basically was along the lines
4 of the recommendation we gave in the site
5 profile review, so the -- the suggested value
6 is okay with us, the revised upwards 16 working
7 level, so that's -- that -- and NIOSH is going
8 to research the question of Gravel Gerties for
9 relevance to NTS. My -- my question about that
10 is the -- the status of the Gravel Gertie
11 workers is kind of unclear to me. Were they
12 Los Alamos or Livermore or Nevada Test Site or
13 do we know?

14 **MR. HINNEFELD:** I don't know today. Gene do
15 you know if -- where the people --

16 **MR. ROLLINS:** I'm not sure I understand the
17 question.

18 **DR. MAKHIJANI:** Well, the question of which --
19 where the records of these workers would be
20 located. Are they classified as workers who
21 came from Los Alamos who worked in the Gravel
22 Gerties just before the tests --

23 **MR. ROLLINS:** They would -- any --

24 **DR. MAKHIJANI:** -- assembling the - the --

25 **MR. ROLLINS:** -- any record of exposure in the

1 Gravel Gerties at NTS would be controlled by
2 the NTS.

3 **DR. MAKHIJANI:** So -- so there's not an issue
4 as to the status of the workers then. They
5 would be regarded as NTS workers.

6 **MR. ROLLINS:** They would be regarded as NTS
7 workers.

8 **MR. PRESLEY:** When you went on site, you
9 swapped your badge for an NTS badge. At least
10 that's what I did. They held my badge out till
11 the day I walked out.

12 **DR. MAKHIJANI:** And then -- but that dose would
13 be added to the -- in a multi-site way if
14 there's a claimant you have --

15 **MR. HINNEFELD:** Right, there are a lot -- as
16 you said, there are a lot of people from Los
17 Alamos and Lawrence Livermore who spent time at
18 Nevada Test Site. And the records of that are
19 pretty clear. We -- we identify both. We get
20 the records from both -- you know, on -- in the
21 event that their Lawrence Livermore record
22 doesn't include their dose received at NTS, we
23 go to NTS and see what record NTS has, so yeah,
24 we would incorporate those.

25 **DR. MAKHIJANI:** So I guess the one outstanding

1 item from that -- from comment 12 is NIOSH is
2 going to research the Gravel Gertie question.
3 And -- and this came up a little bit in Iowa as
4 regards the radon -- radon dose in Gravel
5 Gerties and that Iowa is a high radon area but
6 Texas was not, and so I guess maybe your --
7 your comment regarding relevance of other sites
8 to NTS activity, was that -- was that what --
9 what you were referring to?

10 **MR. HINNEFELD:** I believe that'd be correct. I
11 mean there's other state data relevant to NTS
12 and can we make any -- draw any conclusions
13 along those lines, that would be what we would
14 be interested in.

15 **DR. MAKHIJANI:** So basic-- basically we're in
16 agreement with NIOSH in response to comment --

17 **MR. ROLLINS:** May I ask you a question? These
18 -- these Gravel Gerties -- these were concrete
19 vaults constructed. The air was forced through
20 filters. Is that the situation with Gravel
21 Gerties at -- in use at the other locations?

22 **DR. MAKHIJANI:** I believe so --

23 **MR. ROLLINS:** These are forced-air filters.

24 **MR. PRESLEY:** Yes -- yes, sir. All that I've
25 been in are.

1 **MR. ROLLINS:** And they have -- we have radon
2 measurements available at those locations?

3 **MR. PRESLEY:** I'd say Pantex has probably --

4 **MR. HINNEFELD:** We've got them for Pantex.
5 Okay? We've got them for Pantex.

6 **MR. PRESLEY:** -- got all kinds of them.

7 **MR. ROLLINS:** Okay.

8 **DR. MAKHIJANI:** But this is -- this is an early
9 -- I believe there was one, and only in the
10 early period, at -- at Nevada Test Site, so I
11 think the site-specific conditions would
12 probably be important to know.

13 **MR. PRESLEY:** Unless you can go back and look
14 and see what it is at Pantex, and it may be --
15 I mean the air -- the air circulated through
16 those things just almost instantaneous, but it
17 -- you know, the -- the chances of getting
18 something, I don't know, but they were probably
19 slim and none.

20 **DR. MAKHIJANI:** It may be it's not a big dose,
21 but it just -- it just -- whatever it is, it
22 needs to be put -- resolved.

23 **DR. MAURO:** You know, that -- the handle on
24 this problem for radon -- if it turns out the
25 air turnover's very high, the radon would come

1 in through cracks and penetrations in the
2 foundation of the structure -- I assume it's
3 some kind of concrete foundation and -- and
4 perhaps even the materials --

5 **MR. ROLLINS:** Walls and ceiling.

6 **DR. MAURO:** -- walls, too -- is all --

7 **MR. ROLLINS:** It's all concrete.

8 **DR. MAURO:** The whole thing is underground.

9 Okay, so the -- so your radon -- now the only
10 reason why you get a buildup of radon is that
11 there's a resonance time of the -- of the air,
12 but if you have an air turnover rate of several
13 times per hours, let's say, you know, what's
14 going to happen is the radon's going to be --
15 it's going to be brou-- so you get the fresh
16 radon coming in -- okay? -- without the
17 progeny, 'cause progeny you're not going to see
18 then; they're going to sort of be trapped in
19 the soil and the cracks and fissures, so the
20 progeny don't move in. The radon comes in, the
21 radon goes out and -- before it even has a
22 chance to decay. I -- I think if I was trying
23 to track this and try to come up with a handle
24 on whether or not it's possible to have a
25 buildup of progeny -- certainly if you have

1 measurements, great; I mean if you have working
2 level measurements inside these Gravel Gerties,
3 you know, you've got it covered. But if it
4 turns out you don't and you're trying to get a
5 handle on what kind of working levels might be
6 inside these things, knowing the air turnover
7 rate inside one of these things is going to be
8 the hook to solve this problem. I mean that's
9 -- I -- I just -- I just offer that up as a way
10 to track this if you don't have actual
11 measurements.

12 **MR. ROLLINS:** Taking it -- taking the thought
13 to the limit, if you had extremely high
14 turnover rates -- which you indicate air
15 whistling around; I know in the canyons the
16 air's whistling around 200,000 cubic feet per
17 minute -- but you essentially end up with the
18 same radon inside the Gertie that you have
19 outside, and so you -- now you're starting to
20 assign ambient radon.

21 **DR. MAURO:** Right, and you -- and you don't
22 have a chance for progeny to grow in because
23 the air is not -- the radon is not indoors long
24 enough to -- to have progeny grow in, so there
25 you go, yeah, I agree.

1 **MR. ROLLINS:** But that's something we typically
2 don't do on a project --

3 **DR. MAURO:** Yeah.

4 **MR. ROLLINS:** -- is -- is assign doses to lung
5 --

6 **DR. MAURO:** Yeah.

7 **MR. ROLLINS:** -- from ambient radon.

8 **DR. MAURO:** Oh, yeah. No, I agree with that.
9 What are you talking about, a fraction of a
10 picocurie per liter.

11 **MR. HINNEFELD:** Well, it has to do -- the
12 reason on when we assign radon and when we
13 don't has to do with the nature of the
14 structure.

15 **DR. MAURO:** Yeah.

16 **MR. HINNEFELD:** And if it is a -- if it's a
17 normal working structure, even the basement of
18 a building -- it's a building, even the
19 basement of a building, we consider that part
20 of the natural background. The natural
21 background is included in the IREP risk models
22 and the background risk and so on and so forth,
23 so it's accounted for in that way.

24 **DR. MAURO:** Okay.

25 **MR. HINNEFELD:** But if it's a tunnel --

1 **DR. MAURO:** Man-made special --

2 **MR. HINNEFELD:** -- or a -- or a structure that
3 --

4 **DR. MAURO:** -- special --

5 **MR. HINNEFELD:** -- sort of
6 assimilates/simulates* underground structure
7 like a Gravel Gertie -- we kind of made that
8 decision, there may be others; Gravel Gertie is
9 the one that comes to mind, or tunneling -- in
10 the tunnels, we consider that sort of a non-
11 standard work location and therefore we put the
12 radon in if it's -- it may not amount to
13 enough.

14 **DR. MAURO:** No, no, and I understand it, but --
15 and this is the first time I was yet -- I was
16 informed that the air turnover rate was
17 extremely high, and that's important, and that
18 might -- that might be the solution to this
19 problem -- Gravel Gertie question and radon.

20 **MS. MUNN:** Actually it wouldn't even need to be
21 very high. If you had any forced air at all
22 through it, it seems it would --

23 **MR. PRESLEY:** question. The ambient -- in
24 Nevada, the ambient amount of radon at ground
25 level cannot be too high because of the amount

1 -- the -- the nature of the soil that's on the
2 surface. It's not like east Tennessee where
3 you have the clay that's full of it. I mean if
4 you go down and put a concrete structure 16 or
5 20 foot in the ground, you're still not into an
6 area that's going to produce a tremendous
7 amount, I would not think, of -- of radon.

8 **MR. ROLLINS:** Could be in the aggregate.

9 **MR. PRESLEY:** It could be in the aggregate, but
10 I mean how long -- how long is that going to
11 stay in that aggregate?

12 **DR. ROESSLER:** Where did they get the
13 aggregate.

14 **MR. PRESLEY:** Yeah.

15 **MR. ROLLINS:** Don't know what they used for --

16 **MR. HINNEFELD:** I don't think we're going to
17 have any of these answers today. I'm certainly
18 not up-to-date.

19 **DR. ROESSLER:** It's still not like Tennessee or
20 Pennsylvania or even Iowa, those kind of
21 states, so --

22 **MR. PRESLEY:** So what I've got down here is
23 NIOSH will research the Gravel Gertie problem -

24 -

25 **MR. HINNEFELD:** Yeah.

1 due to I-131 venting need to be taken into
2 account for non-monitored workers.

3 And NIOSH is going to do that, so we have --
4 and going to revise the TBD, give new guidance
5 to the dose reconstructors, so we have no issue
6 with that address.

7 **MR. PRESLEY:** Will revise TBD? Okay. Anybody
8 else have any comments -- 13?

9 (No responses)

10 **INTERNAL DOSE FOR PRE-'67**

11 Fourteen?

12 **DR. MAKHIJANI:** Fourteen, (reading) There are
13 no internal monitoring data until late 1955 or
14 1956; some Pu from then on; some tritium from
15 1958; plutonium, tritium and mixed fission
16 products from 1961; and full radionuclide
17 coverage established about '67. The TBD does
18 not provide significant guidance for estimating
19 internal dose for the pre-'67 periods for many
20 radionuclides.

21 NIOSH response of course is that for the SEC
22 period this question has been resolved because
23 NIOSH has granted SEC based on inability to
24 reconstruct internal dose for that atmospheric
25 testing period, but I didn't -- I didn't see a

1 response to the second part of the comment that
2 would cover '63 to '67. I -- in -- in
3 researching the thing, I -- I must admit I
4 didn't do it deeply enough to know exactly how
5 the thing was phased in, you know, from -- from
6 plutonium and tritium and mixed fission
7 products or whether you have an approach to use
8 for mixed fission product data to bound the
9 doses in some way. But I think -- I think
10 there is -- there is a methodological gap in
11 '63 to '67 that seems to be outstanding still.

12 **MR. HINNEFELD:** Yeah, I believe that it's a
13 fact that we have to have an approach for '63
14 to '67, as we stand today, so I don't know if
15 we say that, but certainly something has to be
16 done '63 to '67, or if we can't develop one,
17 presumably we could extend that period of the
18 class or write a new (inaudible) for a new
19 class. So clearly something -- we need to be
20 able to deal with that, internal doses for '63
21 to '67.

22 **DR. MAKHIJANI:** So I guess that's sort of a
23 pretty big item there.

24 **MR. HINNEFELD:** Yeah, that is.

25 **DR. MAKHIJANI:** I don't believe there's

1 anything else on 14.

2 **BLAST WAVE**

3 **MR. PRESLEY:** Fifteen?

4 **DR. MAKHIJANI:** Fifteen, (reading) Resuspension
5 of radionuclides by the blast wave,
6 fractionation of relatively non-volatile
7 radionuclides due to the variability of Cs-137
8 to -- and the variability of Cs-137 to
9 strontium-90 ratios need to be taken into
10 account for internal dose.

11 This is -- applies only to atmospheric testing
12 and has been taken care of.

13 **MR. HINNEFELD:** Good.

14 **MR. PRESLEY:** Is it okay, no problem?

15 **DR. MAKHIJANI:** No problem.

16 **USE OF PHOTON DOSE**

17 **MR. PRESLEY:** Sixteen?

18 **DR. MAKHIJANI:** (Reading) Use of photon dose,
19 as done by DTRA, as the basis for estimating
20 internal dose during periods when there are no
21 data scattered -- or scattered internal
22 monitoring data has significant uncertainties.
23 These uncertainties are compounded by data
24 integrity issue associated with NTS.

25 And I think this has the same response as

1 before, because it applies to the atmospheric
2 testing period, and that has been taken care of
3 since NIOSH basically re...

4 **MR. HINNEFELD:** Yeah.

5 **DR. MAKHIJANI:** We -- let me just look at my
6 notes just to make sure I'm not forgetting
7 something.

8 Yeah, so in -- in our view, the issue's
9 resolved.

10 **INGESTION DOSES**

11 **MR. PRESLEY:** Okay. Seventeen, ingestion?

12 **DR. MAKHIJANI:** (Reading) Ingestion doses need
13 to be better evaluated.

14 John, in my notes this is your baby. This is -
15 - this is in the context of (inaudible) and I
16 was kind of wondering how I had done this.

17 **DR. MAURO:** Oh, well, let me -- let me see the
18 response, I --

19 **DR. MAKHIJANI:** Basically this -- this relates
20 to resuspension doses from ingestion from
21 resuspension, and I'll go back to our review
22 just to make sure that I didn't miss something.

23 **DR. MAURO:** Okay, I'm looking at your response.
24 You're talking about five milligrams per cubic
25 meter dust loading, and that's up there. In

1 fact, that's the threshold limit value for
2 nuisance dust, five microns. If that's an
3 assumption that you're going to use to bound
4 the doses -- other words, have that kind of
5 dust loading, airborne -- the ingestion -- and
6 then you talk in terms of -- that would be
7 inhalation. And then ingestion, 50 milligrams
8 per day -- again, that would be an upper bound
9 on the -- recommended by the *Exposure Factors*
10 *Handbook*. I guess I'm saying that you --
11 that's -- that's certainly a bounding strategy
12 if that's what you're saying here, without a
13 doubt, to accommodate -- and if I remember, you
14 -- you had pointed out perhaps the -- the doses
15 were still extremely small, in spite of that.
16 Well, then this problem goes away. That's --
17 **MR. ROLLINS:** relative importance of ingestion
18 versus inhalation.
19 **DR. MAURO:** Yeah. Now the only thing I -- I
20 was -- didn't -- didn't understand is the F-1.
21 There were some words here somewhere, and there
22 may be an error on our part, I'm not sure.
23 When you inhale -- when you run IMBA -- okay? -
24 - and you inhale and the -- the stuff that's in
25 the upper -- upper respiratory tract and it's

1 cleared through the mucociliary ladder, then
2 it's swallowed -- what's swallowed has -- let's
3 say it's plutonium oxide, or uranium -- what's
4 swallowed has a certain F-1 once it hits the
5 gut. Now my -- if that F-1 any different than
6 the F-1 you would as-- the absorption fraction
7 you would assume if the stuff was actually
8 directly ingested, hand to mouth ingestion?
9 'Cause here -- I see a comment here that we
10 wrote that -- that I'm not -- when I read it
11 again in your quote where in one case you
12 assume ten to the minus three absorption for
13 actinides and in the other case it's .10 to the
14 minus one.

15 **DR. MAKHIJANI:** That's inhalation versus
16 ingestion.

17 **DR. MAURO:** Well, that -- that's what I was
18 saying. I mean I guess I was surprised to see
19 that, perhap-- I mean I was surprised -- the
20 absor-- the fraction that's -- in both cases
21 we're talking about what's being swallowed?

22 **DR. MAKHIJANI:** No, no, no, no, you're --

23 **DR. MAURO:** No? Okay, maybe I understood --
24 yeah.

25 **DR. MAKHIJANI:** -- you're -- if I remember

1 correctly, we were talking about the relative
2 importance of inhalation versus ingestion --

3 **DR. MAURO:** Yeah.

4 **DR. MAKHIJANI:** -- and -- and the argument was
5 when does ingestion become more important,
6 despite the fact that the F-1 for ingestion is
7 much less than the F-1 for inhalation. So
8 you've got a lot of elbow room before in--
9 ingestion becomes important because of the
10 lower F-1, but the point we made in the review
11 was that at some point it does become important
12 and you have to assess that.

13 **DR. MAURO:** If there's -- okay, but I -- I
14 guess make sure. You don't make a distinction
15 between the F-1 for what's ingested directly as
16 compared to the F-1 which happen-- which is
17 built into IMBA, what -- that's swallowed from
18 the mucociliary ladder. They're both, for ac--
19 for actinides, extremely -- ten to the minus
20 three, on that order. I mean it -- I -- I just
21 wanted to -- 'cause that's what confu-- that's
22 -- am I correct? That's about where they are.
23 They're both treated the same. There's no
24 reason to treat them separately. Okay.
25 I guess my response is, these assumptions that

1 you would make regarding inadvertent ingestion,
2 50 milligrams per day -- in fact, the only
3 thing I would want to point out is Jim, when we
4 discussed this matter at Bethlehem Steel, was
5 concerned with the 50 or 100 milligram per day
6 -- I think EPA recommends a default value of
7 50. I think it's NCRP 123 talks in terms of
8 100 milligrams per day as the amount of inad--
9 soil now, this is soil -- inad-- inadvertent
10 ingestion. To me, 50, 100. The -- Jim -- Jim
11 did some looking into this as it applied to
12 Bethlehem Steel, 'cause if you remember, that
13 was one of the six issues that we were
14 struggling with. And one of the places that we
15 came out on is that -- Jim had his approach,
16 which was based on knowing the airborne dust
17 loading of five micron AMAD settles and you
18 predict on that basis, a certain amount settles
19 out on the surfaces, and then a certain
20 fraction of what settles out is ingested. So
21 there was a direct relationship between what's
22 in the air and what's ingested. And our
23 concern at the time was well, there -- there
24 may not be a direct relationship because what's
25 on the ground that you inadvertently ingest may

1 have gotten there because of spills, because
2 large particles could have directly settled, so
3 as a result -- I'm sorry to re-- re-- this --
4 I -- I -- I mean it's important that we're
5 consistent with the thinking. Jim made a very
6 strong case that the EPA's *Exposure Factors*
7 *Handbook* didn't have very good numbers, and I'm
8 familiar with the literature behind that and I
9 have to agree, but it's sort of become the
10 precedent. People use that all the time. Jim
11 felt that, after doing some looking at it, that
12 he had a better approach that he described at
13 one of our meetings, which was a whole
14 different strategy whereby the ingestion model
15 would not be 50 milligrams per day, it'd be
16 something else, something less.

17 **MR. HINNEFELD:** Something smaller, right.

18 **DR. MAURO:** Smaller, but -- but larger than the
19 number you were coming up with from the .00075
20 --

21 **MR. HINNEFELD:** Right.

22 **DR. MAURO:** -- deposition velocity -- so all
23 I'm saying is that whatever approach -- I -- I
24 think that the ap-- when Jim described his
25 approach to us at one of the meetings on

1 Bethlehem Steel, it was very well-founded in
2 science, to the point where I recommended --
3 it's got to be published 'cause I think EPA's
4 numbers need to be replaced.

5 **MR. HINNEFELD:** Right.

6 **DR. MAURO:** That same approach should be.

7 **MR. HINNEFELD:** Well, it could. I think --
8 using 50, which we -- is high, higher than
9 Jim's -- this issue kind of went away anyway.

10 **DR. MAURO:** And it -- and it went -- it went
11 away anyway.

12 **MR. HINNEFELD:** So you know, we can -- if we
13 can keep it away, we might be more efficient.

14 **DR. MAKHIJANI:** Also Jim's -- Jim's
15 argumentation on Bethlehem Steel was that it
16 was indoors --

17 **DR. MAURO:** That's true.

18 **DR. MAKHIJANI:** -- numbers related to the
19 outdoors, so I don't think you could carry that
20 discussion over. I think this is better --

21 **MR. HINNEFELD:** Okay.

22 **DR. MAKHIJANI:** -- because it relates to an
23 outdoor situation and that applies to Nevada I
24 think.

25 **MR. HINNEFELD:** Right.

1 **DR. MAKHIJANI:** So instead of carrying over a -
2 - a thing out of context, we might have more
3 arguments rather than less arguments.

4 **MR. PRESLEY:** Okay. So you all agree with 17?

5 **DR. MAURO:** We're good. Yeah, we just --

6 **MR. PRESLEY:** No problems?

7 **DR. MAURO:** -- it was a nuance on 17 that -- as
8 far as we're concerned, the problem's solved.

9 **DR. ROESSLER:** Can I ask a curiosity question?
10 What are sterile organs?

11 **MS. BRACKETT:** I was -- I was going to ask that
12 same question.

13 **MR. ROLLINS:** That's a -- that's a -- that's a
14 -- that's a term I picked up from Ken
15 (inaudible).

16 **DR. ROESSLER:** Well, then maybe you ought to
17 tell us.

18 **MR. ROLLINS:** I didn't make that up. The last
19 time I saw him, probably one of the last
20 meetings he attended, he used it and --

21 **DR. ROESSLER:** And what does it mean?

22 **MR. ROLLINS:** It's organs that are not -- that
23 are fed by the bloodstream, that are not open
24 to the atmosphere.

25 **MR. HINNEFELD:** Or the GI.

1 **MR. ROLLINS:** Or the GI. In other words, non-
2 respiratory, non-GI.

3 **DR. ROESSLER:** Oh.

4 NOTE: Multiple speakers commented simultaneously.

5 **DR. MAURO:** Systemic.

6 **MS. BRACKETT:** Systemic organs.

7 **DR. MAURO:** Maybe he meant systemic as opposed
8 to sterile.

9 **DR. MAKHIJANI:** Not in contact with bacteria.

10 **DR. ROESSLER:** Well, I'm glad it's -- a lot of
11 you didn't know what that meant.

12 **DR. MAURO:** I've never heard of it. I never
13 heard of it.

14 **MR. ROLLINS:** Maybe he was slurring, I don't
15 know, but I -- I know he said that.

16 **DR. ROESSLER:** I -- I kind of pictured
17 something --

18 **MR. ROLLINS:** I said well, that's an
19 interesting way to think about it, but if he
20 says it, I can repeat it.

21 **MS. BRACKETT:** I don't know, there's a lot of
22 things he says I don't repeat.

23 **MR. PRESLEY:** Sterile and non-systemic, I bet
24 that's what it was. Okay.

25 Anybody have any more questions on 17?

1 dose data until 1966; the TBD does not specify
2 a procedure for estimating pre-1966 beta dose.
3 When the approach is developed, the large hot-
4 particle issue will need to be taken into
5 account.

6 And NIOSH says it is developing an approach by
7 re-reading the original -- oh, it has developed
8 an approach --

9 **MR. HINNEFELD:** Well, we're developing time-
10 dependent -- what did we say?

11 **MR. ROLLINS:** Photon to beta.

12 **MR. HINNEFELD:** Yeah, photon to beta -- the re-
13 reading of the films, I guess that was proposed
14 by what, (inaudible)? Did he still --

15 **MR. ROLLINS:** No, no, that was Ron Catherine
16 that proposed that.

17 **MR. HINNEFELD:** We haven't committed to doing
18 that. We are...

19 **DR. MAKHIJANI:** So this is -- this is kind of
20 an open question --

21 **MR. HINNEFELD:** It's an open question.

22 **DR. MAKHIJANI:** -- as to how you are going to
23 address skin cancers and things like that for -
24 - between --

25 **MR. ROLLINS:** Actually I think the method

1 that's underway right now, if I'm not mistaken,
2 is the -- using the Harry Hicks data to do the
3 beta/gamma ratios.

4 **DR. MAURO:** That would be external, not the
5 stuff that deposits on the skin, and that's
6 certainly appropriate. In other words, that's
7 the stuff that's on the ground or on surfaces,
8 and you want to know the ratio of the photon to
9 beta, you can do that. That's very tractable.
10 But the stuff that falls on the skin --

11 **MR. HINNEFELD:** Yeah, the hot-particle issue,
12 which --

13 **DR. MAURO:** -- hot particles is a --

14 **MR. HINNEFELD:** -- which is part of that NRVU*
15 --

16 **DR. MAURO:** Yeah, right, that -- which is part
17 of that, so --

18 **MR. HINNEFELD:** -- so it has to be -- you know,
19 both --

20 **DR. MAURO:** -- it's within that context.

21 **MR. HINNEFELD:** -- both those have to be
22 incorporated into the skin dose value.

23 **DR. MAURO:** By the way, do you -- in OTIB-17
24 doesn't really engage that issue.

25 **MR. HINNEFELD:** Yeah, OTIB -- that's part of

1 our earlier discussion on hot particles.

2 **DR. MAURO:** Right, right. I just wanted to
3 point that -- 'cause you mentioned OTIB-17 that
4 -- you know, certain --

5 **MR. HINNEFELD:** There's a particular approach
6 in there that -- it's the average dose -- the
7 risk is the average dose over the organ --

8 **DR. MAURO:** Right.

9 **MR. HINNEFELD:** -- is that really the case,
10 that's part of the whole discussion we need to
11 -- hot particle issue we talked about this
12 morning.

13 **DR. MAURO:** Yeah.

14 **DR. MAKHIJANI:** I mean I -- I -- in looking at
15 the NIOSH response, I couldn't tell whether --
16 how it's going to come out. I don't have a
17 sense of what's going to come out of this or --
18 whether this issue is resolvable or -- neither
19 do you? Is that what you said?

20 **MR. HINNEFELD:** So it's research under way.

21 **DR. MAKHIJANI:** Yeah.

22 **MR. HINNEFELD:** It's research under way, like
23 many of the issues you've raised here today.
24 You know, we don't know today how -- how it'll
25 be resolved because the research is under way.

1 **DR. MAKHIJANI:** Right. Right, but on some of
2 them it's clear that there's going to be some
3 technical answer to the question, but on this I
4 couldn't -- I couldn't figure out whether there
5 is one or not.

6 **DR. MAURO:** we had talked for a minute or two
7 --

8 **MR. HINNEFELD:** Yeah.

9 **DR. MAURO:** -- before the meeting that might be
10 helpful. Just coincidentally, I spent about
11 five years looking at the fallout -- BRAVO
12 exposure of Rongolapese, and they had some very
13 serious skin beta dose, and there's a lot of
14 literature and data on real people with real
15 exposures from external gamma, external beta
16 and beta deposited directly on the skin from
17 direct fallout, and beta particles deposited on
18 the skin from resuspension and redeposition on
19 clothing and skin. And the -- the hook -- and
20 there's also clinical data on -- on the amount
21 of exposure and the levels of exposure that
22 caused what type of clinical outcomes from skin
23 damage. If the answer doesn't lie in there
24 somewhere, I'm quite -- not quite sure how
25 you're going to get a hook on this one.

1 **MR. HINNEFELD:** Right.

2 **DR. ROESSLER:** That's deterministic.

3 **DR. MAURO:** Well, yeah, but it's dosimetric.
4 That is -- yeah, there are -- the -- certainly
5 they had -- they had a full range, from
6 reddening up through lesions, bleeding --

7 **DR. ROESSLER:** (inaudible)

8 **DR. MAURO:** -- pustular lesions, but there is
9 actually -- you know, it's almost like a
10 dosimetric, you could actually make a curve,
11 you know, what -- what doses they received and
12 what were the symptoms experienced. And you
13 rela-- and the doses to skin can be linked back
14 to the external doses. So it's almost as if
15 once you know the external dose you could apply
16 a multiplier that gives you --

17 **DR. ROESSLER:** (inaudible)

18 **DR. MAURO:** -- yeah, like I say, the external
19 of gamma dose -- I'm not saying you can do it,
20 don't get me wrong, I'm saying that if it
21 doesn't -- if you don't -- if the -- the
22 literature that's -- the body of literature
23 that was developed around that doesn't offer a
24 hook in dealing with the hot-particle beta dose
25 issue, I don't know what does.

1 Item 20?

2 **NON-USE OF BADGES**

3 **DR. MAKHIJANI:** I think we've covered 20. This
4 is the -- (reading) appears to have been non--
5 intentional non-use of badges in some
6 circumstances to avoid approaching or exceeding
7 dose limits. Practice may have occurred until
8 the mid-1960s or even extended into the 1970s.
9 NIOSH has not investigated this problem, which
10 raises questions on the integrity of the
11 external dose record possibly into the 1970s,
12 which need to be explicitly addressed.
13 So I think we covered this under 11b.

14 **MR. PRESLEY:** NIOSH will investigate. Okay.
15 Any more comments on 20?

16 (No responses)

17 **EXTREMITY DOSIMETRY**

18 Twenty-one?

19 **DR. MAKHIJANI:** (Reading) TBD does not contain
20 information about extremity dosimetry. Site
21 status of bomb assembly workers is unclear.
22 So their -- TBD is being revised to have
23 external dosimetry guidance. NIOSH has
24 developed it. And bomb assembly workers it
25 says were mostly laboratory -- Los Alamos and

1 Livermore workers, and so I guess the issue has
2 been punted from NTS to Los Alamos and
3 Livermore TBDs, is that how I understand --
4 **MR. HINNEFELD:** Well, I think we could -- we
5 could probably --
6 I guess my thought is that extremity dosimetry,
7 you know, for our program is only going to
8 matter for people who have cancer on their
9 extremity. You know, that's -- you know,
10 that's -- so there -- that's pretty limited,
11 based on the cases I've seen. You know, you
12 see -- even skin cancers you tend to --you
13 don't tend to see on the extremities. There's
14 a lot of facial skin cancer, but not so much on
15 the extremities, so the extremity being the
16 site -- the origin of the cancer is really
17 pretty rare in our claimant population, so --
18 and that's the only ones you have to worry
19 about the extremity dosimetry.
20 Now once you get a case like that, the
21 extremity to -- if you have a whole body dose,
22 the extremity to whole body dose is largely a
23 geometric issue, and it's been measured at a
24 number of sites. You know, people who worked
25 close into material at arm's length -- at arm's

1 length, like glovebox workers, et cetera, and
2 so the geometric issue is -- is measured in
3 many places. And so since it's already a
4 geometric issue anyway, an adjustment to the
5 whole body badge that could be applied to the
6 extremity if we don't have any extremity data
7 is probably a feasible approach for this. And
8 it -- like I said -- will have very limited
9 applicability because we don't see very many
10 cancers that originate on the -- on the
11 extremities.

12 **MR. ROLLINS:** Well, there weren't very many
13 opportunities at NTS --

14 **MR. HINNEFELD:** Right.

15 **MR. ROLLINS:** -- for large radiation gradients.

16 **DR. MAKHIJANI:** Yeah, I think the Gravel Gertie
17 -- the bomb assembly was very, very limited, as
18 I understand it.

19 **MR. HINNEFELD:** So that's --

20 **MR. ROLLINS:** Consequently I haven't seen much
21 -- in fact, I don't think I've seen any
22 extremity monitoring information at NTS.
23 That's not to say there isn't some, but I
24 haven't seen any, going through the records
25 I've gone through, so --

1 **MR. ROLFES:** I've seen some. I can identify a
2 couple of claims.

3 **MR. ROLLINS:** Give me the numbers, let me take
4 a look at them.

5 **MR. HINNEFELD:** Do you remember if they were
6 laboratory workers or were they, or do you
7 remember?

8 **MR. ROLFES:** One was a -- a rad monitor, so --

9 **MR. HINNEFELD:** Okay. NTS rad monitor?

10 **MR. ROLFES:** Yep.

11 **MR. ROLLINS:** I'd like to look at that one.

12 **MR. PRESLEY:** Did they hang it on the wall or -

13 -

14 **MR. ROLFES:** It's claim number 3367.

15 **MR. ROLLINS:** 3367?

16 **MR. ROLFES:** Yeah.

17 **MR. PRESLEY:** -- where they would hang the
18 monitors on the wall in the rooms or...

19 **MR. ROLFES:** Have I seen any? No, I haven't --

20 **MR. PRESLEY:** No --

21 **MR. HINNEFELD:** What -- what extremity
22 dosimetry did you see --

23 **MR. PRESLEY:** Yeah.

24 **MR. HINNEFELD:** -- was it on a wrist or a ring
25 or what?

1 **MR. ROLFES:** I believe it was a wrist badge.

2 **MR. HINNEFELD:** So extremity would be either a
3 wrist or a ring badge.

4 **MR. ROLLINS:** Did you see a remarkable
5 difference between the wrist and the whole
6 body?

7 **MR. ROLFES:** Yeah, this -- this individual had
8 about maybe one and a half rem on -- on his
9 wrist badge and maybe 600 millirem on his whole
10 body badge.

11 **MR. PRESLEY:** So 21, everybody's in agreement,
12 no problem?

13 **DR. MAURO:** This -- this rela-- relationship
14 you just described, but that's gamma.

15 **MR. ROLFES:** Yes.

16 **MR. PRESLEY:** All right, no problem? Okay.
17 Comment 22?

18 **NEUTRON DOSES**

19 **DR. MAKHIJANI:** (Reading) There are no neutron
20 dose data until 1966, and partial data until
21 1979. TBD assertion that neutron doses during
22 atmospheric testing were negligible has not
23 been substantiated and may be in error for some
24 workers.

25 And here I didn't agree with the NIOSH response

1 in regard to the distance because Barton
2 Hacker's official history does indicate there
3 was some tension in the AEC, which was worrying
4 about safety, and the DoD, which was wanting to
5 push personnel closer for their own operational
6 sort of readiness reasons, presumably. And I'm
7 not -- I'm not clear there -- there's kind of a
8 procedural answer to this -- to this question
9 in the way that -- that NIOSH has suggested.
10 And the -- the response in the post-1960 --
11 where am I? Yeah, it's not clear to me that
12 six -- six kilometers was actually the limit in
13 practice. I think in some -- in most -- some
14 or most tests, it might actually have been, but
15 maybe a look at Hacker's archive, or an
16 interview with him, might be useful because he
17 does -- he does mention this -- this problem of
18 the -- the tension between safety and -- and
19 the DoD.

20 **MS. MUNN:** There's -- there's a little problem,
21 I think, in relying -- in -- in asking our
22 technical people to go to journalists and
23 historians for advice here, and that's probably
24 a dreadful thing for me to say because I know,
25 being an Oregon State graduate, he's a past

1 member of our faculty -- but I didn't spend
2 much time in the history department, I was kind
3 of busy over in the rad center. But I guess --
4 there's -- there's a -- I'm not saying one must
5 ignore that -- that at all, but what I'm saying
6 is, asking our technical people to rely on --
7 on non-technical reports for their
8 understanding of what transpired on a site may
9 create some dissonance in how we're viewed as
10 asking our -- our technical folks to proceed.
11 Perhaps I'm being overly sensitive to that, I
12 don't know, but you understand what I mean --
13 mean when I say that.

14 **DR. MAKHIJANI:** Oh, I -- absolutely. Yeah, Ms.
15 Munn, I absolutely understand, and the
16 suggestion wasn't that NIOSH should go to
17 Barton Hacker for the answer, and that's partly
18 why I pointed to his archive. I have looked at
19 his book and he -- he was given -- he was sort
20 of given the charge of writing the official
21 history, so he -- he has looked at the
22 documents, including the classified documents,
23 so his archive is very substantial. And in
24 this matter, which is not a dosimetry matter
25 but, you know, where were the troops stationed

1 and are there documents that would help us
2 resolve this question, and there may be
3 documents that he might be able to point to.
4 Instead of having a month-long research project
5 to arrive at your own conclusion, you may have
6 day-long research project.

7 **MS. MUNN:** If there's a bibliography of raw
8 data, that's one thing. But if -- if we're not
9 talking about references to raw data, then
10 there's -- it's -- it's -- if a historian had
11 access to the data, then certainly NIOSH and
12 ORAU have access to the data. I guess that's
13 my point.

14 **DR. MAKHIJANI:** Yeah, and that was the
15 suggestion, basically. Anyway -- and so far as
16 I know, Mr. Hacker's history -- Dr. Hacker's
17 history does not contain the numbers and -- it
18 contains a reference to this problem, which is
19 how I interpreted when I read it and referenced
20 it, and so the suggestion is not to accept
21 what's there, 'cause there's no -- no technical
22 information there anyway. But if he has some
23 raw data that might resolve this issue --
24 otherwise, maybe it cannot be resolved.

25 **MR. HINNEFELD:** Well, DTRA might have it. DTRA

1 might know where those troops were. I think
2 they know. I think.

3 NOTE: Multiple speakers commented simultaneously.

4 **MR. ROLLINS:** Troops are not covered under this
5 program.

6 **MR. HINNEFELD:** Troops are not covered, but
7 there's a question of where the radiation
8 monitors, you know, there with the troops, did
9 they look for hot spots as the troops marched
10 in. At least Brady in his interview said --

11 **MR. ROLLINS:** Well, looking for hot spots would
12 not be -- they -- they would not necessarily be
13 there when they first --

14 **DR. MAKHIJANI:** All the radiation --

15 **MR. HINNEFELD:** Well, right --

16 **MR. ROLLINS:** This is a neutron issue --

17 **MR. HINNEFELD:** -- neutron issue the first --

18 **MR. ROLLINS:** -- first only.

19 **MR. HINNEFELD:** If -- if the practice was this,
20 if the practice was the troops were hunkered
21 down close to the blast, and then right after
22 the blast they marched them down to ground zero
23 -- just for psychological testing, so to speak
24 -- and if there was a monitor that preceded
25 them to look for particularly hot areas before

1 they started out, that monitor would have to be
2 in position relatively close to the troops at
3 the blast. It may be one person, maybe one or
4 two people. They may not have been AEC
5 monitors. Maybe DoD took their monitors, but
6 Brady did say that -- Brady's interview said
7 that they did it, as I recall.

8 NOTE: Multiple speakers commented simultaneously.

9 **DR. MAKHIJANI:** He -- he himself was in the --
10 he himself was in the aircraft that went
11 through the mushroom clouds -- on one occasion,
12 at least -- and so I raise the issue only in
13 that context because -- and I don't have a
14 definitive answer to this. It's a question.

15 **MR. ROLLINS:** -- there when the burst occurred,
16 probably throw it away in six months. It does
17 funky things to airplanes when that blast kind
18 of flies back.

19 **MS. MUNN:** -- all that electronic stuff.

20 **MR. ROLLINS:** It's turbulence.

21 **MS. MUNN:** Yeah, I know --

22 **MR. PRESLEY:** What are we going to do now for
23 22?

24 **MR. HINNEFELD:** We'll try to -- we'll -- we'll
25 look for some evidence, either with Hacker,

1 with DTRA, you know, presence close by, try to
2 get some additional information about
3 monitored, I suppose. And again -- I mean we
4 said less than a millirem at six kilometers,
5 right? Isn't that what we said? Of course
6 there's -- at what point does -- you know, so
7 if it's less than a millirem at six kilometers,
8 then at three kilometers it'd be four times as
9 high as that, so how close could they have been
10 and really is there going to be -- it may be -
11 - it may just go away 'cause if they were never
12 closer than three kilometers, and so you're at
13 four --

14 **DR. MAKHIJANI:** Maybe a sample calc--

15 **MR. HINNEFELD:** -- four millirem .

16 **DR. MAKHIJANI:** That might be a good approach
17 if, you know, there's no easily-available
18 information, then the issue can be rendered
19 kind of moot.

20 **MR. PRESLEY:** Going to look for new information
21 on neutron dose. Right?

22 **MR. HINNEFELD:** Yeah.

23 **DR. MAURO:** Then do a -- demonstrate that the
24 issue is moot, based on dose -- dose -- scoping
25 calculations.

1 **MR. PRESLEY:** There's two parts, we've got 23a,
2 23b, which most of the area (inaudible).

3 **MS. MUNN:** Uh-huh.

4 **MR. PRESLEY:** 23b, same thing?

5 **MS. MUNN:** Uh-huh.

6 **MR. PRESLEY:** Okay.

7 **MS. MUNN:** It's even more likely that they were
8 nowhere near the hot spots.

9 **DR. MAKHIJANI:** This is your issue of spatial
10 coverage, John.

11 **DR. MAURO:** It's -- yeah, this -- I mean we're
12 getting a little bit more into the granularity
13 of the issue where we're talking about the way
14 in which measurements are made -- it looks like
15 in situ measurements made, and the coverage
16 that you get out of putting in a jelly -- you
17 know, and start to try to characterize and --
18 and is that level adequate. And so -- it is
19 very much in keeping with everything else we've
20 talked about about the level of resolution
21 really needed in order to do a good job in
22 reconstructing doses to wor-- to workers at the
23 site. So I would say it -- it also is part and
24 parcel to the previous, but it probably worth -
25 - when -- when it's developed and discussed,

1 within the context of this particular mode of
2 measurement, you know, it's relevant. Namely
3 these -- the reference we made to is about a --
4 each reading would be about a ten meter by ten
5 meter square. I'm not -- no, no, I'm sorry.
6 Each -- you only pick up 3.5 percent of the
7 area -- I mean that's the issue -- by making
8 these kinds of measurements. Is that good
9 enough for you -- for a person to -- to use as
10 the basis for doing a dose calculation.

11 **MR. HINNEFELD:** Well, certainly, you know, with
12 respect to this, I -- I guess I kind of have
13 mixed feelings on this. I mean there are --
14 there are other data besides these intermittent
15 sampling that would kind of describe the
16 distribution, you know, fly-overs and things
17 like that --

18 **DR. MAURO:** And that might be -- and that might
19 be the answer.

20 **MR. HINNEFELD:** -- which kind of showed a
21 pattern of, you know, isopleths and -- and so
22 there's sort of other characterization besides
23 these bit by bit samples.

24 **DR. MAURO:** Yeah, so collectively all the
25 information may actually create the picture you

1 need.

2 **MR. HINNEFELD:** It -- it may -- and it may work
3 out, and -- and again, resuspension of areas
4 and -- areas that sound pretty big probably
5 don't become very -- you know, probably don't
6 have a lot of really granularity to the outcome
7 when you're talking about resuspension. You
8 think about a six mile per hour wind that's
9 blowing at about nine feet per second, so it'll
10 cross a 500-foot grid in about a minute.

11 **DR. MAURO:** So it's an integrator.

12 **MR. HINNEFELD:** Yeah. So you're essentially
13 integrating all the -- you know, the
14 contamination as you resuspend and distribute
15 it on the wind --

16 **DR. MAURO:** In principle, I think that I would
17 agree.

18 **MR. HINNEFELD:** -- you're essentially averaging
19 --

20 **DR. MAURO:** You're averaging over a large area,
21 so...

22 **MR. HINNEFELD:** -- once it gets airborne, yeah.

23 **DR. MAKHIJANI:** Good point.

24 **MR. PRESLEY:** 23b then?

25 **DR. MAKHIJANI:** I think 23b is covered under

1 the previous.

2 **DR. MAURO:** Yeah.

3 **MR. PRESLEY:** So you want to skip 24?

4 **HIGH-FIRED OXIDES**

5 **DR. MAKHIJANI:** (Reading) Presence of high-
6 fired oxides resulting from atmospheric weapons
7 testing and reactor testing needs to be
8 investigated.

9 And NIOSH is developing guidance, and we're
10 okay with that.

11 **DR. MAURO:** It's a done deal.

12 **UNIDENTIFIED:** (inaudible)

13 **DR. MAURO:** That's for tomorrow.

14 **MR. PRESLEY:** That's exactly -- I'm going to
15 put down here --

16 **DR. MAKHIJANI:** This issue has been dealt with
17 in the context of Rocky Flats and NIOSH is
18 going to reflect that in its NTS (inaudible)
19 and we're okay with that.

20 **MS. BRACKETT:** Well, I -- is this two separate
21 issues? I mean there's the issue of how to
22 assess an intake of super S or high-fired
23 oxide, but then I believe part of this question
24 is are there high-fired oxides present that
25 need to be addressed, so that --

1 **DR. MAURO:** I think -- I think the an-- in
2 dealing with this, the issue might very well be
3 here also, and how it plays out -- in other
4 words, we very much have developed how it plays
5 out at Rocky, and its implications and how to
6 deal with it so they can do dose
7 reconstructions. The degree to which this
8 issue is at play here and how to deal with it
9 in light of the protocols that are laid before
10 us, probably needs to be addressed -- and --
11 and -- and to the extent to which the precedent
12 established by Rocky is helpful here, great.
13 It may turn out the issue is not very
14 significant here at all.

15 **MS. BRACKETT:** Is that -- I just meant that,
16 you know, addressing it tomorrow doesn't cover
17 it here, because --

18 **DR. MAURO:** No.

19 **MS. BRACKETT:** -- the concern is --

20 **DR. MAURO:** No.

21 **MS. BRACKETT:** -- was it present and do we
22 actually have to do something --

23 **DR. MAURO:** No, the -- yeah, I -- the only
24 point being is that you will stand on the
25 shoulders of the work that has tomorrow --

1 **MS. BRACKETT:** Right.

2 **DR. MAURO:** to be -- be held to be responsive
3 to this.

4 **MR. HINNEFELD:** Yeah.

5 **DR. MAKHIJANI:** I -- I agree with Liz that
6 there is a piece that needs to be done
7 regarding reactor testing and atmospheric
8 tests. Atmospheric tests, in a way, only --
9 the only way that it enters in is in the
10 resuspension because --

11 **MR. HINNEFELD:** In later years.

12 **DR. MAKHIJANI:** In later years.

13 **MR. HINNEFELD:** Yeah, because you want to be
14 doing the internals for the atmospheric testing
15 period anyway, so resuspension of that material
16 and is it high-fired -- yeah, okay.

17 **DR. MAKHIJANI:** And then you have the reactor -
18 -

19 **MS. MUNN:** Do we know that --

20 **MR. HINNEFELD:** (inaudible)

21 **MS. MUNN:** Do we know that --

22 **MR. HINNEFELD:** (inaudible)

23 **MS. MUNN:** Do we know that?

24 **MR. HINNEFELD:** Well, today I don't know.

25 **DR. MAKHIJANI:** (inaudible) reactor.

1 **MR. HINNEFELD:** There's been a lot of studying
2 out there and somebody (inaudible) attention to
3 it.

4 **MS. MUNN:** Well, yeah, you'd think somebody
5 would know. I would never have thought. I
6 wouldn't have thought --

7 **MR. HINNEFELD:** You get it high enough fired,
8 it's glass.

9 **MS. MUNN:** So surely somebody's done something
10 that would tell us, but who where.

11 **MR. HINNEFELD:** That's the problem, you've got
12 a lot of studies --

13 **MR. PRESLEY:** Going to revise the Technical
14 Basis Document down the road sometime to
15 identify this question about high-fired
16 plutonium.

17 **DR. MAKHIJANI:** Whether high-fired oxides were
18 generated.

19 **MR. PRESLEY:** Okay.

20 **MS. MUNN:** Yeah.

21 **MR. PRESLEY:** Okay.

22 **DR. MAURO:** And -- and it does have a ripple
23 effect. I mean the degree to which it's
24 determined that yes, they were, then it bears
25 on the -- let's say the validation of the

1 resuspension model, as you had mentioned
2 earlier, regarding the bioassay for plutonium
3 because it does affect how that -- other words,
4 I think that once it's determined that yes, we
5 are dealing with high-fired with the plutonium
6 or uranium or whatever, transuranics, and its
7 implications regarding post-'62 dose
8 reconstruction, including the use of the data
9 as validation for some of the resuspension
10 models -- you know, it needs to be embraced.

11 **MR. HINNEFELD:** Okay.

12 **DR. MAURO:** But there -- the science upon which
13 these -- the -- these -- the answers lie will
14 emerge -- has emerged from the work that was
15 done on Rocky. In other words, understand the
16 kinetics and what a kin-- what assumptions or
17 adjustment factors need to be applied. And
18 then if you do have that problem here, apply
19 them and see what the implications might be.

20 **MR. HINNEFELD:** Right.

21 **MR. PRESLEY:** It's going to apply to plutonium
22 oxides. Right? Okay.

23 Number 25.

24 **SITE EXPERT INTERVIEWS**

25 **DR. MAKHIJANI:** (Reading) NIOSH documentation

1 of site expert interviews is inadequate, and
2 crucial site expert interviews have not been
3 performed or performed in an incomplete manner,
4 notably Barton Hacker and William J. Brady.
5 Potentially critical archives and documents
6 have not been reviewed, including the Naval
7 Radiological Defense Laboratory and Barton
8 Hacker primary reference materials.

9 So there was a little bit of a surprise for me
10 in the response here in that NIOSH says they
11 documented almost five hours of discussion with
12 Mr. Brady in early 2004. We were aware of a
13 contact between NIOSH and Mr. Brady and thought
14 we had the full information about the one
15 question that was put to him, and we published
16 that. But we have seen nothing on this five
17 hours of interview or its documentation, and he
18 certainly didn't remember it when I talked to
19 him -- asked him about it, I believe more than
20 once.

21 **MR. ROLLINS:** We have that -- we have that
22 documented.

23 **MR. HINNEFELD:** Yeah.

24 **MR. ROLLINS:** It wasn't me, it was some of the
25 people on our team.

1 **MR. HINNEFELD:** Yeah.

2 **MR. ROLLINS:** And they've -- they've documented
3 that.

4 **DR. MAKHIJANI:** Could we request --

5 **MR. PRESLEY:** Is it --

6 **MR. HINNEFELD:** Can you pull it up?

7 **MR. PRESLEY:** Has it been redacted or -- or
8 checked for classification where it might be --

9 **MR. ROLLINS:** I don't -- I don't -- I'm not --
10 I'm not certain exactly what records were kept
11 there as far as those conversations are
12 concerned except -- except private
13 communication records were -- were kept that
14 yes, we went and talked to Mr. Brady and we
15 talked about these issues. Probably --
16 probably did not take as good notes, looking
17 back on it now, as they should have. But I
18 wasn't involved in those discussions, but these
19 -- there were several people on our team that
20 had a personal relationship with him and they --
21 -- they asked to speak with him basically not as
22 a -- you know, just as a personal relationship
23 sort of thing and they -- and they talked about
24 these sorts of things while they were there, so
25 -- you know, probably couldn't have gotten to

1 talk to him under -- under other circumstances.
2 My understanding his health was not very well -
3 - very good and he wasn't going to talk to just
4 anybody, but he knew these people from way back
5 so he agreed to speak with them.

6 **MS. MUNN:** They may have a good memory that can
7 provide some additional notes that might --
8 might be -- might make --

9 **MR. ROLLINS:** Well, there's more -- there's
10 more in there as here --

11 **MS. MUNN:** Right.

12 **MR. ROLLINS:** -- it's just not here. Okay?

13 **DR. MAKHIJANI:** Okay.

14 **MR. PRESLEY:** Make sure -- can we ask that that
15 be provided to SC&A? Before something like
16 that (inaudible) go out (inaudible) be checked
17 for classification, please?

18 **MR. HINNEFELD:** Classified?

19 **DR. MAKHIJANI:** Certainly, I --

20 **MR. HINNEFELD:** When does the conversation
21 occur.

22 **MR. ROLLINS:** If we -- if we -- if we -- if we
23 formalize the notes of the discussion -- if I
24 understand the question correctly, if we
25 formalize the notes of the discussion with the

1 various principals at the NTS that that -- that
2 piece of information must go through a
3 derivative classifier before it's given to the
4 Board, and I happen to know one at NTS that I'm
5 sure would be more than happy to do it.

6 **MS. MUNN:** That's good.

7 **DR. MAKHIJANI:** Mr. Brady was certainly -- I
8 don't know him, I've never met him, but he was
9 certainly very gracious with me and -- and
10 spent quite a lot of time with me. I -- you
11 know, he -- he is unwell and has certain
12 restrictions about how much and when he can
13 talk and so on, but he was -- he was really --
14 he gave a lot of his time to me in reviewing
15 the notes and -- and in spending time with me
16 on the phone. But the broader point that came
17 up in this context was exactly this question of
18 documentation of NIOSH interviews because when
19 we talked to NIOSH during -- during the process
20 of developing this review, one of NIOSH's
21 comments was, you know, that they take down
22 what's relevant. And that didn't seem to
23 strike us -- that is, I guess -- Kathy DeMers
24 and I are the main ones that are doing the
25 review. There are -- or interviews, and there

1 are others who were involved, but we normally
2 try to write down the highlights of whatever
3 the person is saying and decide on its, you
4 know, relevance in terms of what we think is
5 relevant independently of that and let the
6 interview stand on its own because sometimes
7 you can't tell the relevance of something until
8 you've finished your research. And it doesn't
9 -- it doesn't seem -- somehow -- the larger
10 comment here in regard -- aside from the
11 specific person involved, seemed to be that the
12 interview should be taken for what it is. I
13 mean if you respect the person enough to
14 interview them, then you have to -- you have to
15 represent what they said and not what -- what
16 you want to write down for what they said.
17 And it's a more generic question, but it came
18 up very sharply during -- during this
19 particular review.

20 **MR. PRESLEY:** I'm going to mark this as an open
21 issue with a notation on it that NIOSH will
22 provide interview data to SC&A, and then we'll
23 be looking for your comments back.

24 **MS. MUNN:** Do you find the other interviews
25 that were done as being applicable or adequate?

1 **DR. MAKHIJANI:** We -- we did look -- we did
2 look at some of the other interviews, like the
3 ones that were done with Martha DeMarre, and
4 some of it was very useful --

5 **MS. MUNN:** It would appear to be very
6 extensive.

7 **DR. MAKHIJANI:** Yes, and some of it was useful.
8 The one -- the one thing that kind of stood out
9 was this -- this problem with the badges that
10 was -- was missing from the NIOSH record, which
11 came up in our interview -- in independent
12 interviews that we did, and it came up despite
13 the fact that we didn't have any particular
14 personal relationships or history with the site
15 or any reason for people to have or not have
16 confidence in us. It was just -- it just came
17 up, and it was documented by us at face value.
18 But it didn't seem to be recorded anywhere in
19 the NI-- although NIOSH did really do an
20 extensive amount of work in relation to drawing
21 out NTS site experts, and I believe the TBD did
22 benefit from that. We did look over it and I
23 think NIOSH did a lot of good work. I just
24 think -- maybe it came up and it wasn't
25 documented, maybe it didn't come up, I don't

1 know what happened. That was a very big and
2 important gap. It should have come up. But I
3 personally wasn't aware of this issue. It just
4 -- it came up in the course of the interview
5 from Mr. Brady, and similarly I believe it came
6 up when Kathy and Tom Bell were interviewing
7 Martha DeMarre and her colleagues
8 independently. I -- I don't believe they were
9 aware of the issue.

10 **MS. MUNN:** Well, I -- I thought everyone was
11 aware that every site that existed had people
12 who maintain that they did that, or were told
13 to do that. That's a -- that's -- I mean that
14 -- it's -- it's no --

15 **DR. MAKHIJANI:** I will look over my notes, but
16 I don't believe, for NTS anyway, that I -- it
17 was a surprise to me that the principal health
18 physicist himself said that he did this thing.

19 **MS. MUNN:** Yeah, that -- that surprise -- it
20 surprises me, too, because -- but it's
21 indicative of some -- some other experiences
22 that you hear these kinds of reports from
23 almost all sources. So we shouldn't be -- I
24 guess what I'm saying is it shouldn't be
25 surprising that you hear the report. Whether

1 or not the -- the practice is something that
2 can be confirmed or not is a different thing,
3 but to hear the report is no surprise.

4 **MR. PRESLEY:** Well, we're down to -- according
5 to my computer, this thing says 39 of 39.
6 Anybody have any more comments on any of the --
7 on the comments that we have, concerns or
8 issues that they want to address, any of these
9 -- Mark, do you want to add anything?

10 **MR. ROLFES:** No, not at this time. Thanks,
11 Bob.

12 **MR. HINNEFELD:** Now Bob, you took a note -- did
13 you take a note with each finding in terms of a
14 resolution pathway, is that what --

15 **MR. PRESLEY:** Yeah, what I did is I did comment
16 -- just going by each and then -- and then took
17 a short thing of what we need to do.

18 **MR. HINNEFELD:** So you're going to share that
19 with all of us --

20 **MR. PRESLEY:** Yeah.

21 **MR. HINNEFELD:** -- then so we all work from
22 that same list, or at least have us --

23 **MR. PRESLEY:** Now what I --

24 **MR. HINNEFELD:** -- take a look at it.

25 **MR. PRESLEY:** -- plan on doing is -- is doing

1 my comments and sending it around and let
2 everybody add theirs to it.

3 **MR. HINNEFELD:** Okay.

4 **MR. CLAWSON:** I have -- I have one question.
5 We kept talking about the reactors down there.
6 We only dealt with the rocket motor reactors.
7 You know, there were others down there and they
8 -- they blew off --

9 **MR. ROLLINS:** The propulsion --

10 **MR. CLAWSON:** -- the --

11 **MR. ROLLINS:** The propulsion motors were
12 mentioned in here, too.

13 **MR. CLAWSON:** Yeah, the propulsion motors. Did
14 -- did they mention the rover reactor that they
15 blew up?

16 **MR. HINNEFELD:** Is that in the site profile?

17 **MR. CLAWSON:** Did that change anything with the
18 graphite? I know they spent over four to five
19 months cleaning up the desert after that, so
20 everything -- I just --

21 **MR. ROLLINS:** That's where -- that's where a
22 lot of people got the doses that were pushing
23 the limits.

24 **MR. CLAWSON:** Okay. Well, I just -- 'cause I
25 worked on the other end of that so knowing

1 what came through with that and I understood
2 there was quite a bit, but I just kind of kept
3 hearing the propulsion and I just wanted to
4 make sure the rover --

5 **MR. PRESLEY:** The rover was a propulsion.

6 **MR. CLAWSON:** Yeah.

7 **MR. PRESLEY:** You -- I mean that's -- I presume
8 that that's what they -- they called
9 propulsion, which would encompass -- to me it
10 would encompass the -- the mishap or whatever
11 you want to call it when -- when we blew rover
12 sky high out there.

13 **MR. HINNEFELD:** They might call that a mishap.

14 **MR. PRESLEY:** It was.

15 **DR. MAKHIJANI:** I think -- I think Gene
16 mentioned cleanup workers in relation to the
17 hot particles when -- when we talked about it,
18 which was a new one for me, and I have it in my
19 notes.

20 **MR. PRESLEY:** I'm glad that happened out there
21 and not in Oak Ridge. I don't know whether you
22 all are aware or not, but we did have something
23 similar to that that they ran on Sundays in Oak
24 Ridge for a few years at the tower/tire*
25 shielding reactor. You could hear it. I -- we

1 lived within about 12 miles so we could hear
2 that thing fire up. They would fire it up on
3 Sundays. Everybody would be away from ORNL X-
4 10 facility. They'd fire that thing up and you
5 could hear it roaring in Oak Ridge. Nobody
6 knew what it was for years.

7 **MS. MUNN:** It was an adequate propulsion system
8 was what it was.

9 **MR. PRESLEY:** Inadequate propulsion system, is
10 that what you said? That's right -- a huge
11 one, at that.

12 Lew, have any comments?

13 **DR. WADE:** Well, not technically, but
14 procedurally I think we need to look at sort of
15 a path forward. If you look at sort of
16 milestones, there are a number of sort of --
17 there's lots of small issues and some major
18 issues were collected. I mean I tried to keep
19 a running list of what I thought the major
20 issues were. You had the hot particle issue.
21 We have an issue on oro-nasal breathing. There
22 are many issues surrounding resuspension. You
23 have this issue of the covered badges and a
24 mechanism for dealing with that. You have
25 issues of internal dose from '63 to '67. You

1 have the need of a coworker model or some
2 mechanism for dealing with external dose prior
3 to '57. You have the post-1966 beta dose that
4 we have to deal with. We have issues about the
5 presence of high-fired oxides.

6 **MR. HINNEFELD:** I believe it's pre-'66.

7 **MR. PRESLEY:** Pre-'66.

8 **DR. WADE:** Pre-'66?

9 **MR. HINNEFELD:** Pre-'66 beta dose, as opposed
10 to (inaudible).

11 **DR. WADE:** Ah, pre-- I'm sorry, pre-'66 beta
12 dose.

13 So those are issues. The only reason I run
14 down that litany is as we look at a path
15 forward, the Board will have a call on August
16 the 8th, and certainly the Chair of the working
17 group can report out, you know, status and
18 significant issues. There's a Board meeting in
19 Nevada in the middle of September, so I think
20 the working group needs to get a sense from
21 NIOSH and ORAU and SC&A as to the pace of the
22 work here, and then the working group needs to
23 decide when it wants to engage again. And I
24 think those are issues for you to talk about
25 now as we look at sort of the path forward. I

1 guess it would start with NIOSH, who I think
2 has the biggest list of, you know, when are you
3 going to be ready to -- to share in a
4 significant -- in a significant enough volume
5 that would warrant the working group coming
6 back together.

7 **MR. HINNEFELD:** Well, given the number of
8 issues and if we're -- and the -- well, let me
9 think about this for a minute. We have a
10 number of items where we said we will amend the
11 site profile, we agree we're going to amend --

12 **DR. WADE:** Right.

13 **MR. HINNEFELD:** -- so those are -- are those
14 ones we're pursuing in general but we're --

15 **DR. WADE:** Right.

16 **MR. HINNEFELD:** -- you know, some of the ones
17 you've mentioned, we've said that.

18 **DR. WADE:** Right. I think really it's where
19 there's intellectual lifting to do. I think
20 that's when the working group needs to engage.

21 **MR. HINNEFELD:** Okay, there's the resuspension
22 issue that we talked about that we have some
23 issue to deal with. It's not clear -- it's not
24 clear to me that we will have substantial --
25 substantial progress toward all the things we

1 have to be -- have to be done by the September
2 Board meeting. I think that would be too
3 optimistic. In order to make substantial
4 progress, we'd -- on all the things, including
5 the things we -- where there's agreement, you
6 know, the TBD to write. I guess I'd like to
7 get a better sense of outlining and -- with --
8 with the ORAU team in terms of the task, and
9 maybe provide some feedback and proposed
10 schedule when we think some of these issues
11 where we're still in discussion, we didn't
12 necessarily agree right off, where we think --
13 you know, when we think we can come back. I
14 hate to predict sitting here and, you know, I
15 don't know how free Gene is to commit his own
16 time. He has a management structure that I'm
17 not a part of that essentially gives him his
18 priorities, so it's a little difficult for us
19 to do that in this meeting, but we should be
20 able to gather relatively quickly and provide
21 information to the working group before --
22 maybe before the August 8th phone call, but
23 that's pretty close, with some ideas about when
24 -- some issues we might be able to deal with
25 forthwith for a few things, for the -- the ones

1 where we're still -- where we didn't
2 necessarily line up and agree today. So you
3 know, maybe a time in --

4 **MR. PRESLEY:** I can see us having our -- our
5 comments ready possibly by August 8th.

6 **MR. HINNEFELD:** Right.

7 **MR. PRESLEY:** On the -- you know, or the issue
8 comments. But as far as what you all have to
9 do between August the 8th and September the --
10 week of September 18th --

11 **MR. HINNEFELD:** I don't know that we'll be able
12 to make much progress before the next Board
13 meeting. August --

14 **MR. PRESLEY:** I hate to say it, but all I can
15 see maybe is a -- is a report at the --

16 **MR. HINNEFELD:** 'Cause August 8th is less than
17 two weeks away.

18 **MR. PRESLEY:** Right, and I'm -- I'm busy as I
19 can be, too, and I know you all are, 'cause I -
20 - I'm going to try to sit down tonight and push
21 these things together and maybe if y'all are
22 going to be here tomorrow or something --

23 **MR. HINNEFELD:** I'll be here Thursday.

24 **MR. PRESLEY:** Okay.

25 **MR. HINNEFELD:** Are you going to be here

1 Thursday?

2 **MR. PRESLEY:** Yeah.

3 **MR. HINNEFELD:** Okay.

4 **MR. PRESLEY:** If nothing breaks I'll give them
5 to you and we --

6 **MR. HINNEFELD:** Okay.

7 **MR. PRESLEY:** -- cuss them and discuss them.

8 **MR. HINNEFELD:** And then probably between the
9 August 8th phone call and the September 21st
10 meeting, we may be able to come out with a
11 schedule for when we can deliver our product
12 that we committed to on some of these issues
13 that are in -- where we're still in discussion,
14 where we haven't converged.

15 **DR. WADE:** There I think --

16 **MR. HINNEFELD:** Somewhere in that --

17 **DR. WADE:** -- I think it's a reasonable path
18 forward.

19 **MR. HINNEFELD:** -- time frame we could maybe --

20 **MR. HINNEFELD:** So the -- a summary of what
21 happened here will be shared with all. You'll
22 go back and caucus and look at when you will be
23 able to produce intellectual product that will
24 be worthy of bringing the working group back
25 together. Once you share that information,

1 John will have to look at how long it will take
2 his people to get their mind around that. So
3 all of this should be aiming at setting a time
4 for the working group to come back together
5 with sufficient new information to justify that
6 happening. And while we can't set that date
7 today, I think we need to be reali-- we need to
8 realize that we need to be pushing for that
9 because, again, we all know what happens if we
10 don't keep our focus; then it's easy to -- to
11 get distracted and -- so I -- I would think
12 that would be a reasonable course of action.
13 And then Robert, you can set the time for the
14 next working group meeting when this sort of
15 comes together.

16 **MR. PRESLEY:** Yeah, I would -- you know, I'm
17 going to be honest with you. I'd love for us
18 to vote on this thing while we're at the Test
19 Site -- I mean we're -- we're at NTS. But with
20 what we did today, I --

21 **MR. HINNEFELD:** We have enough action that
22 we've agreed to do, you know, just not even
23 counting the things where we're still -- we
24 have enough stuff that we've agreed to do that
25 require research that I don't see us having a

1 resolution --

2 **MR. PRESLEY:** Right, this last item --

3 **MR. HINNEFELD:** -- in front of the working
4 group at the time --

5 **MR. PRESLEY:** -- on here I think is going to be
6 -- that's going to be one of your long-wait
7 items is trying to pull all that stuff
8 together.

9 **DR. WADE:** There again, this is a site profile
10 review, so there doesn't have to be a formal
11 vote. I mean I --

12 **MR. HINNEFELD:** Right.

13 **DR. WADE:** -- but I think we need to continue
14 to make progress to -- to see that these issues
15 are -- are raised, debated, resolved, closed,
16 and then we work our way down to the tail of
17 the curve. We made great progress today. I
18 just think we want to keep some sense of
19 urgency to it.

20 **MS. MUNN:** Maybe we could consider at least a
21 working group phone call toward the end of
22 August, try to --

23 **MR. HINNEFELD:** Well, we can aim for that.
24 Again, I -- I really -- I need to caucus with
25 management on the ORAU side to make sure that -

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MR. PRESLEY: It doesn't take long to get a working group phone conversation going. We can -- you know, if they get enough done, I don't see a problem with that.

MR. HINNEFELD: And we can share -- I would assume if we have a product we can share with the working group and SC&A at any time --

MS. MUNN: Oh, yeah.

MR. HINNEFELD: -- we'll share it. You know, when we have a product together, we'll share at that time.

MR. PRESLEY: We could always meet in Vegas the Friday before the 18th.

MS. MUNN: Oh, yeah, right.

DR. ROESSLER: Government rate, no less, over the weekend.

MS. MUNN: And we could fix ourselves over the weekend, couldn't we?

DR. WADE: But I think great progress has -- you -- you did extremely well today. I think the discipline of the discussion was fine. I mean I think you've made great progress on a number of issues. We just want to stay with it.

1 **MS. MUNN:** Yeah, if we could -- if we could aim
2 for a phone call, say the week of August 21st
3 sometime, then we'd at least have something on
4 our schedule for --

5 **MR. PRESLEY:** August what did you say?

6 **MS. MUNN:** Oh, I --

7 **MR. HINNEFELD:** What do you want to accomplish
8 on the phone call?

9 **MS. MUNN:** Well, accomplish on -- hopefully on
10 the phone call, if there are any additional
11 issues that you -- that have been encountered
12 or that -- that still are -- are really thorns
13 in the side for SC&A --

14 **MR. HINNEFELD:** Okay.

15 **MS. MUNN:** -- that we can at least get a sense
16 of how things are moving along, and if there's
17 any -- any major item that is going to take
18 more than the kind of discussion that's gone on
19 here today, in order for everyone to be aware
20 of where we're going.

21 **MR. PRESLEY:** August 21st, is that what you
22 said, that week?

23 **MS. MUNN:** That -- sometime that week seems to
24 be --

25 **MR. PRESLEY:** Okay, it'll have to be the first

1 part of the week.

2 **DR. WADE:** Well, we have a -- there is another
3 working group meeting on the 22nd --
4 August -- the week of August 21st.
5 Yeah, the Savannah River Site's meeting on the
6 22nd. You know, we could try -- would the 23rd
7 work for you, Wednesday?

8 **MR. PRESLEY:** Yeah.

9 **DR. WADE:** How would the 23rd be?

10 **MS. MUNN:** Phone call, tentatively.

11 **DR. WADE:** Pick a time that's convenient for
12 westerners as well as easterners.

13 **MS. MUNN:** Thank you so much.

14 **MR. PRESLEY:** How about 9:00 o'clock?

15 **MS. MUNN:** Yeah, right -- again.

16 **DR. WADE:** What do we say, 11:00 or 1:00 --
17 11:00 a.m. or 1:00 p.m.?

18 **MR. PRESLEY:** Why don't we do it at 1:00? That
19 gives everybody time. What do you think about
20 that, 1:00 in the afternoon?

21 **MS. MUNN:** Perfect for me.

22 **MR. CLAWSON:** 1:00 our time or yours?

23 **MR. PRESLEY:** No, 1:00 -- 1:00 eastern standard
24 time, which would be --

25 **MS. MUNN:** 10:00 my time --

1 **MR. PRESLEY:** -- which would be 10:00 you-all's
2 time.

3 **MS. MUNN:** -- 11:00 your time.

4 **MR. PRESLEY:** That way we get lunch out of the
5 way. The majority of the people in this part
6 of the -- are in this part of the country and
7 that gets your lunch and stuff like that out of
8 the way.

9 **DR. ROESSLER:** August 23rd?

10 **MR. PRESLEY:** Yes, August 23rd, 1:00 o'clock
11 p.m. eastern standard time.

12 **DR. WADE:** Eastern daylight time.

13 **MR. HINNEFELD:** Eastern -- eastern daylight
14 time.

15 **MR. PRESLEY:** There you go.

16 **DR. ROESSLER:** It's okay, I can eat on -- while
17 I'm on the phone.

18 **MR. PRESLEY:** We'll shoot for that.

19 **DR. WADE:** With an understanding that call will
20 be a -- sort of an update, and maybe just to
21 get a status as to, you know, whether or not
22 there are significant issues that warrant, you
23 know, the working group getting together to
24 work or whether it appears to be as we imagined
25 it was today.

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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 July 25, 2006; 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 13th day of August, 2006.

STEVEN RAY GREEN, CCR**CERTIFIED MERIT COURT REPORTER****CERTIFICATE NUMBER: A-2102**