

UNITED STATES OF AMERICA
DEPARTMENT OF HEALTH AND HUMAN SERVICES
CENTERS FOR DISEASE CONTROL AND PREVENTION

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NATIONAL INSTITUTE FOR OCCUPATIONAL
SAFETY AND HEALTH
ADVISORY BOARD ON RADIATION AND
WORKER HEALTH

+ + + + +

TBD 6000/6001, APPENDIX BB WORK GROUP

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WEDNESDAY, MARCH 11, 2009

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The meeting came to order at
10:00 a.m., in the Zurich Room of the
Cincinnati Airport Marriott Hotel, Hebron,
Kentucky, Paul L. Ziemer, Chairman, presiding.

PRESENT:

PAUL L. ZIEMER, Chairman
JOSIE M. BEACH, Member
MARK GRIFFON, Member*
WANDA I. MUNN, Member*
JOHN W. POSTON, SR., Member

THEODORE M. KATZ, Acting Designated Federal
Official

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IDENTIFIED PARTICIPANTS:

NANCY ADAMS, NIOSH Contractor*
DAVE ALLEN, NIOSH
BOB ANIGSTEIN, SC&A
ISAF AL-NABULSI, DOE*
JOHN T. DUTKO, Public*
EMILY HOWELL, HHS
ROY LLOYD, HHS*
JOHN MAURO, SC&A
DAN MCKEEL, Petitioner*
JIM NETON, NIOSH
STEVE OSTROW, SC&A*
JOHN RAMSPOTT, Public*
BILL THURBER, SC&A*

*Participating via telephone

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

2 (10:00 a.m.)

3 MR. KATZ: Good morning to everyone
4 on the phone. If someone would just let us
5 know that you can hear.

6 MEMBER MUNN: This is Wanda. I can
7 hear you.

8 MR. KATZ: Wanda, great. Nice to
9 hear you. Good morning to you, early morning
10 to you.

11 MEMBER MUNN: Very.

12 MR. KATZ: So this is the TBD
13 6000/6001 Work Group of the Advisory Board on
14 Radiation and Worker Health, and we're getting
15 started here. We always begin with a roll
16 call, and we'll begin in the room with Board
17 members, starting with the Chair.

18 CHAIR ZIEMER: Yes, this is Paul
19 Ziemer, Chair of the Working Group.

20 MEMBER POSTON: John Poston,
21 Working Group.

22 MEMBER BEACH: Josie Beach, no

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1 conflicts, Working Group.

2 MR. ALLEN: Dave Allen, NIOSH.

3 CHAIR ZIEMER: Board members?

4 MR. KATZ: And so --

5 CHAIR ZIEMER: On the phone.

6 MR. KATZ: On the phone?

7 CHAIR ZIEMER: Wanda Munn, right?

8 MEMBER MUNN: Correct.

9 MR. KATZ: And no conflict?

10 CHAIR ZIEMER: And is Mark Griffon
11 on the phone? Okay, Mark should be joining
12 us.

13 MR. KATZ: Right. I'm sure he'll
14 let us know.

15 CHAIR ZIEMER: Board members.
16 That's all of the work group members.

17 MR. KATZ: Right.

18 CHAIR ZIEMER: Any other Board
19 Members --

20 MR. KATZ: No.

21 CHAIR ZIEMER: -- that are
22 eavesdropping, listening in this morning?

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1 Okay.

2 MR. KATZ: Okay, we do have a
3 quorum, and now to NIOSH/ORAU team in the
4 room.

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

7 MR. ALLEN: Dave Allen again,
8 NIOSH, no conflict.

9 MR. KATZ: And anyone from the
10 NIOSH/ORAU team on the phone? Okay. None.
11 None noted. The SC&A -- well, let's do SC&A
12 team in the room.

13 DR. MAURO: John Mauro, no
14 conflict.

15 DR. ANIGSTEIN: Bob Anigstein, no
16 conflict.

17 MR. KATZ: And on the line, anyone
18 from SC&A?

19 MR. THURBER: Bill Thurber, no
20 conflicts.

21 MR. KATZ: Welcome, Bill.

22 MR. OSTROW: Steve Ostrow, no

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1 conflicts.

2 MR. KATZ: Okay. Can you say that
3 name again?

4 MR. OSTROW: Steve Ostrow.

5 MR. KATZ: Oh, Steve. Welcome,
6 Steve.

7 MR. OSTROW: Thank you.

8 MR. KATZ: Steve Ostrow, and now
9 other federal employees in the room?

10 MS. HOWELL: Emily Howell, HHS.

11 MR. KATZ: And on the line, any
12 NIOSH or other federal employees?

13 MR. LLOYD: Roy Lloyd, HHS.

14 MR. KATZ: Roy Lloyd, HHS. Thank
15 you.

16 MS. AL-NABULSI: Isaf Al-Nabulsi,
17 DOE.

18 MR. KATZ: Can you say your name
19 again, please?

20 MS. AL-NABULSI: Isaf Al-Nabulsi.

21 MR. KATZ: Isaf.

22 CHAIR ZIEMER: That's Isaf --

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1 MR. KATZ: Isaf.

2 CHAIR ZIEMER: -- from DOE.

3 MR. KATZ: Okay.

4 CHAIR ZIEMER: Good morning, Isaf.

5 MR. KATZ: Good morning. Welcome,
6 and who have I left out? Now, going to
7 members of the public and Congress, let's
8 start with petitioners for GSI on the line.

9 MS. ADAMS: Nancy Adams, NIOSH
10 contractor.

11 CHAIR ZIEMER: Nancy.

12 MR. KATZ: Okay, Nancy. Welcome,
13 Nancy. Do we have any GSI petitioners on the
14 line? Any members of the public on the line?

15 CHAIR ZIEMER: Who want to identify
16 themselves?

17 MR. KATZ: Who want to identify
18 themselves, of course.

19 MR. RAMSPOTT: This is John
20 Ramspott with GSI.

21 MR. KATZ: John, welcome.

22 MR. RAMSPOTT: Thank you.

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1 MR. DUTKO: This is John T. Dutko,
2 magnaflux operator and betatron operator, GSI.

3 MR. KATZ: Welcome, John.

4 MR. DUTKO: Thank you, sir.

5 MR. KATZ: Any other members of the
6 public who want to identify themselves or
7 representatives, staff, or representatives
8 from Congress? Okay. Then just let me remind
9 everyone on the line to mute their phones, *6
10 if you don't have a mute button, and if you
11 need to go offline, hang up and dial back in.
12 Please don't put the call on hold, and, Dr.
13 Ziemer, it's --

14 CHAIR ZIEMER: Okay. Thank you
15 very much, Ted. We'll call the meeting to
16 order. I want to take a moment and go over
17 the proposed agenda. I did distribute it to
18 members of the Work Group and to some of the
19 staff members, as well, both OCAS and the
20 Board's contractor, SC&A. I believe I sent a
21 copy of it to John Ramspott. John, did I send
22 you a copy?

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1 MR. RAMSPOTT: Yes, sir, you did.
2 Thank you.

3 CHAIR ZIEMER: Yes, and I think to
4 Dr. McKeel, the other petitioner, but there
5 may be others on the line that did not receive
6 this, so let me just review where we hope to
7 go today, and we'll pace ourselves
8 accordingly.

9 We're going to begin by going
10 through the TBD 6000 findings matrix. That's
11 the overall technical basis document that is
12 the generic document under which the various
13 appendices reside, and we will -- we have
14 since our last meeting received the NIOSH
15 responses to the contractor's findings, and we
16 have also received additional comments from
17 the contractors on the NIOSH responses, so we
18 will go through those findings in the TBD 6000
19 findings matrix. And to the extent we're able
20 to, we'll try to close out some items in that
21 matrix.

22 Then we will focus on Appendix BB,

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1 which is the General Steel Industries'
2 specific part of the technical basis document,
3 and there is an issues matrix for Appendix BB,
4 but, as you will recall and we'll see as we
5 get to it, almost all of the issues in the
6 matrix center on the film badge exposure data,
7 the so-called Landauer data, so we will have a
8 discussion that focuses on that data.

9 There has been some analysis by
10 SC&A, some additional input from the
11 Petitioners, and we'll have an opportunity to
12 review what we have there and comment and
13 discuss and see where we are in terms of the
14 usefulness of the film badge data and the
15 extent to which it will assist NIOSH in the
16 bounding of doses for the facility and then
17 other GSI issues that we perhaps want to
18 address also.

19 And then I'd like to take at least
20 a preliminary look at where we are on the
21 Petition Evaluation Report. This will be
22 simply a status report, I think, from our

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1 contractor. They were tasked at our last
2 meeting to begin the SEC review, and, John, if
3 you --

4 DR. MAURO: For GSI.

5 CHAIR ZIEMER: For GSI on Appendix
6 -- well, not on Appendix BB specifically, but
7 the GSI petition review, and we'll just get an
8 update on sort of the timetable on where we
9 are, and I put in the agenda, preliminary
10 identification, if possible, of issues that
11 are emerging, and then, finally, we'll take
12 time to establish a timetable and path forward
13 on the open items that we have before us and
14 any assignments that we need to address before
15 a follow-up Work Group meeting.

16 My goal, as I said on the written
17 agenda, was to adjourn by 4:00. One of our
18 members has to leave, I think, by 3:30 to
19 catch a plane, so I actually will target that,
20 if possible, as an outside time for closing.

21 We're allowed to finish earlier
22 than that. We don't have to extend the

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1 discussions to meet the time available, but
2 hopefully we can be efficient and try to
3 finish in a timely fashion.

4 So that's kind of an overview. We
5 are going to take a lunch break approximately
6 12:00. It will depend a little bit on where
7 we are in the discussions, and I think, since
8 we're having a somewhat later start than many
9 of our Work Group meetings, I didn't schedule
10 a mid-morning break.

11 I'm hopeful we can go two hours.
12 If the Chairman is unable to, we may take a
13 comfort break, but otherwise we'll go until
14 noon and take a lunch break for an hour.

15 Well, with that, let me ask if
16 there are any questions or comments or, any of
17 the Work Group members, are there items that
18 you wish to add to the agenda or modify?
19 Okay.

20 Wanda, if you have comments, please
21 speak up, and also let me check and see if
22 Mark Griffon has come on the line yet.

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1 Apparently not. Okay. Let's proceed, then.

2 Now, on the TBD 6000 findings
3 matrix, there are several versions of the
4 matrix. There's the original version, which
5 was generated, I think, in November of 2008.
6 In fact, the date is on the document, November
7 11, 2008.

8 The NIOSH responses were added on
9 March 6, and those responses have been cleared
10 for Privacy Act purposes, so that is an open
11 document. I believe it is available to the
12 Petitioners, although this is the generic one,
13 not specific to General Steel Industries, but,
14 in any event, the document with the March 6
15 responses is cleared.

16 The Board or the Work Group
17 subsequently has received from the contractor
18 some added replies to the NIOSH responses.
19 Those added replies are dated March 9, which
20 means that they came to the Work Group on
21 Monday of this week.

22 Those have not been Privacy Act

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1 cleared, but in a preliminary fashion it's at
2 least been determined that it's unlikely that
3 there is any Privacy Act information in them,
4 and the Work Group may be able to discuss
5 them, since they are simply replies to the
6 NIOSH responses, but counsel is with us and is
7 here to guide us if we go astray on any
8 privacy matters.

9 So, with those preliminary
10 comments, let's move to the TBD 6000 findings
11 matrix, and let me ask is there anyone at the
12 table here that does not have a copy? And,
13 Wanda, do you have a copy of the findings
14 matrix as I have described it?

15 MEMBER MUNN: I'm working from the
16 March 9.

17 CHAIR ZIEMER: Okay, which means
18 you have the findings, the response, and the
19 reply on each item.

20 MEMBER MUNN: Correct.

21 CHAIR ZIEMER: Right. Okay. Very
22 good. So we're all working from the same

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1 sheet, and I think we'll just go through these
2 in order. There are seven items on the
3 findings list, and we also had a cover letter
4 from John Mauro, and, John, I think your cover
5 letter -- I'm trying to remember.

6 Maybe it was the email that was
7 with the transmission, and it said this. It
8 said, attached is SC&A's response to the
9 response matrix distributed by NIOSH on March
10 6 pertaining to TBD 6000. Note that SC&A
11 believes that Findings 1, 2, and 3 are
12 basically resolved. However, additional
13 discussion needed regarding 4 and 7.

14 DR. MAURO: Four through seven.

15 CHAIR ZIEMER: Four through -- four
16 through seven, and I just give that as a
17 preliminary sort of statement on your behalf,
18 John --

19 DR. MAURO: Sure.

20 CHAIR ZIEMER: -- that, at least,
21 SC&A appears to be comfortable with the first
22 three items, but let's go through them,

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1 because if we are to recommend closure on
2 them, that has to be an action of the Work
3 Group.

4 So Finding Number -- SC&A Finding
5 Number 1 or Issue Number 1 -- let's identify
6 the issue and then the finding. The issue is
7 failure to discuss elevated levels of thorium
8 234, and is this protactinium-234m -- close to
9 surface of freshly cast --

10 DR. ANIGSTEIN: Oh, it got --

11 CHAIR ZIEMER: There's a word
12 missing here.

13 DR. ANIGSTEIN: It got scrolled
14 off. It was ingots.

15 MR. KATZ: Freshly cast ingots.

16 DR. ANIGSTEIN: Ingots.

17 CHAIR ZIEMER: That's right. On the
18 matrix copy the ingots is missing, but it
19 should say, surface of freshly cast ingots.

20 The finding, the TBD would benefit
21 from a discussion of the possibility and
22 potential dosimetric significance of uranium

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1 metal working operations involving freshly cut
2 uranium ingots where there might be elevated
3 levels of thorium-234 and protactinium-234m
4 close to the surface of the ingot.

5 Furthermore, it is not clear from
6 the TBD whether scrap recovery at any of the
7 covered AWE sites involved melting and casting
8 of uranium. This should be investigated,
9 since it could make a significant difference
10 in the external dose reconstruction protocol.

11 And then I'm going to ask Dave
12 Allen from NIOSH, who is responsible for the
13 NIOSH responses, Dave, can you either recap or
14 describe or explain? We have the words here,
15 but -- and you can go over the words, as well.

16 I don't know that I want to read them all
17 here but basically your take on this as far as
18 NIOSH is concerned.

19 MR. ALLEN: Well, our take on that,
20 as what's in the words there, is we agree that
21 issues should be -- you know, the TBD would
22 benefit from a discussion of that, and some

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1 more research needed to be done to figure out
2 exactly where that's going to go.

3 The second part of that, the scrap
4 recovery, is that the TBD was not clear as to
5 whether scrap recovery involved recasting of
6 uranium or not, and I agree that that's true,
7 too. It wasn't clear in it, but the general
8 idea of the TBD is some of these -- the jobs
9 are broken down into -- it wasn't broken down
10 into sites.

11 It was broken down into types of
12 jobs, and recasting is one of those, and scrap
13 recover is another one of those, and in some
14 cases, if they had recasting equipment, they
15 would actually take briquettes or chunks of
16 steel -- I'm sorry, chunks of uranium that
17 were cut off and recast those.

18 If a facility had recasting, they
19 would almost definitely also be doing scrap
20 recovery, and there would be both operations
21 happening in that facility, and the way the
22 TBD would be used is they had recasting. They

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1 had scrap recovery. They had, you know,
2 possibly other operations, and we'd look at
3 all of those. If you can't sort it out, then
4 you pick the high one for a particular
5 facility.

6 So I think the TBD needs to be
7 clarified that the scrap recovery would not
8 include recasting as a separate operation
9 covered in there, but I think it's already in
10 the TBD essentially as multiple operations at
11 a facility. You look at all the operations in
12 the TBD.

13 DR. NETON: Refresh my memory. The
14 6000 then covers recasting. 6001 was really
15 the one where --

16 MR. ALLEN: 6001 mentions it in
17 there, yes, and as I mentioned last time, that
18 was -- when we were developing 6001, it was
19 for refining essentially for uranium compounds
20 versus 6000 is for uranium metal, and there
21 were some points where it wasn't clear where
22 the cutoff should be, especially reduction,

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1 you know, which one do you put that in, and
2 this ended up in 6001. It is also in 6000, I
3 think, so --

4 DR. NETON: But did not 6001
5 address this issue of the daughters/progeny
6 rising to the surface in what we call that top
7 crop, you know, that kind of --

8 MR. ALLEN: No, it addressed
9 recasting, but it didn't mention the
10 concentration of dotters on the surface.

11 DR. NETON: Somewhere I know we've
12 covered this in one of our documents, and it
13 might have been at the uranium facility.

14 MR. ALLEN: It might have been. I
15 mean, for the most -- the primary production
16 for recasting was --

17 DR. ANIGSTEIN: I think at
18 Mallinckrodt.

19 DR. NETON: I recall having this
20 discussion before.

21 CHAIR ZIEMER: One at a time.
22 John?

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1 DR. MAURO: Yes, I have the 6000,
2 let's see, the 6001, I believe. No, I have it
3 here, and I was about to quickly thumb through
4 it. Now I know Bill Thurber is on the line.
5 Bill, are you on the line? Bill Thurber?

6 CHAIR ZIEMER: You may have to
7 un-mute your phone, Bill.

8 MR. THURBER: I'm here, John.

9 DR. MAURO: Yes, hi, Bill. Do you
10 recall whether this business of the
11 thorium-234 protactinium being an elevated
12 level on the ingot recasting being an issue
13 that we raised in TBD 6001?

14 MR. THURBER: I don't believe --
15 excuse me. I don't believe so.

16 DR. MAURO: And so that was not an
17 issue.

18 MR. THURBER: I'd have to
19 double-check that.

20 DR. MAURO: Well, if you can, check
21 it while we're working. Maybe you could get
22 back to us on that, because, yes, I don't

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1 recall whether it was there or not.

2 DR. NETON: Bob's right. There was
3 another point at a regular uranium facility.
4 It probably was Mallinckrodt.

5 DR. ANIGSTEIN: Yes, that's right.

6 DR. NETON: We discussed this very
7 issue, and I don't recall what the resolution
8 of that was, but certainly we could go back
9 and look at that.

10 DR. ANIGSTEIN: The Mallinckrodt
11 TBD specifically mentioned it.

12 DR. MAURO: I think that's where it
13 started, but let me bring up a point. When
14 you make mention of the recasting process as
15 perhaps may or may not be part of the TBD 6000
16 scope, quite frankly, when I was looking at
17 this, I wasn't thinking so much of recasting,
18 but when you receive an ingot or material,
19 metal, if it's freshly cast, when it arrives
20 -- now, I recall the half-life of the
21 thorium-234 being not so short.

22 DR. ANIGSTEIN: Twenty-four days.

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1 DR. MAURO: Twenty-four days. That
2 it's possible that when it shows up it still
3 may have elevated levels, because elevated
4 levels go up at a factor of ten or more
5 higher, so you could lose a half-life.

6 Let's say the time period is
7 relatively short. You may -- the recipient of
8 the metal at the AWE facility may receive
9 metal that is elevated, at least for some time
10 period before the unsupported thorium goes
11 away. So I would say on the front end and the
12 back and of the metal --

13 DR. NETON: We need to look into
14 that, because I think we -- deja vu. I
15 remember having this conversation before. I
16 think this was a known issue in the formation
17 of uranium metal, and the progeny would
18 actually --

19 DR. MAURO: Float.

20 DR. NETON: -- float to the
21 surface, for lack of a better word, and they
22 would cut that off. I mean, there would be

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1 what they call the top crop to remove that
2 high activity progeny.

3 DR. ANIGSTEIN: That was one type
4 of casting, whether it was done. Like, for
5 instance, in the vacuum induction furnace that
6 definitely occurred. However, and sometimes
7 they actually removed it. They would call it
8 the skull, and it would be -- it would be this
9 very hot material we remove, but on the other
10 hand, as Putzier mentioned, sometimes, and
11 depending on the --

12 I can't -- and I don't recall
13 exactly the form, but in some cases, even when
14 it's cast maybe in the bomb -- Bill Thurber,
15 correct me if I'm wrong on that -- that formed
16 on the surface, not just floated to the top,
17 but it simply went to the outside.

18 MR. THURBER: I believe that
19 Putzier said that it was -- it could go to the
20 surface of the casting, as well as just to the
21 top, and so you have -- the issue exists then
22 with handling the crop didn't get. It also

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1 exists with handling the casting molds and so
2 forth where there will be enhanced
3 concentrations of thorium-234 and
4 protactinium-234m.

5 DR. NETON: Isn't this primarily a
6 beta dosimetry issue then, or is it internal,
7 as well?

8 DR. ANIGSTEIN: No, no, a gamma,
9 also.

10 DR. NETON: Well, gamma, but I mean
11 external.

12 DR. ANIGSTEIN: Not external.

13 DR. NETON: External dosimetry.

14 DR. ANIGSTEIN: Oh, yes, external,
15 yes.

16 MR. THURBER: Yes, it's external
17 and primarily beta.

18 CHAIR ZIEMER: My question then is
19 do we need to transpose or import from the
20 Mallinckrodt analysis? Does this need to show
21 up in this document? Is that --

22 DR. NETON: I think it needs to be

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1 addressed in this document, and that's what
2 Dave said.

3 CHAIR ZIEMER: Even if you refer to
4 the analysis then previously or just
5 incorporate it here?

6 DR. NETON: Yes, it needs to be
7 addressed in some way in the document, whether
8 it's by reference to some other approach, or
9 we could -- it would probably be simpler just
10 to put a section in there that addresses how
11 it would be handled. Do you agree with that,
12 Dave?

13 MR. ALLEN: Yes.

14 DR. NETON: I think that's kind of
15 --

16 MR. ALLEN: I think that's what I
17 was trying to say is it definitely needs to be
18 addressed. Exactly how, I think we've got to
19 look a little deeper, including the
20 Mallinckrodt discussions from long ago.

21 DR. NETON: Yes, I mean, the simple
22 solution is, well, acknowledge it was there

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1 and have some factor if that was the case or
2 determine that it wasn't really as much of an
3 issue, because they were aware of it in the
4 foundries that it came from and address it
5 that way.

6 CHAIR ZIEMER: John Mauro, in your
7 reply you mentioned an 82 reference.

8 DR. MAURO: The Putzier reference.

9 CHAIR ZIEMER: Putzier reference
10 that deals with this issue.

11 MEMBER POSTON: I wanted to point
12 out it's not in your reference list.

13 DR. ANIGSTEIN: Yes, it is.

14 MEMBER POSTON: No, it isn't.

15 DR. ANIGSTEIN: I beg your pardon.

16 It's on the second -- the Putzier reference
17 is on page 4 of the matrix.

18 MEMBER POSTON: Oh, there's two
19 different reference lists.

20 DR. ANIGSTEIN: We stick that in.

21 MEMBER POSTON: Oh, come on. I
22 swear.

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1 DR. ANIGSTEIN: There's a reference
2 to the attachment and a reference list to the
3 matrix.

4 MEMBER POSTON: I went to the back.

5 CHAIR ZIEMER: At the end of the
6 matrix there are four references.

7 MEMBER POSTON: Okay. All right.
8 It is there.

9 CHAIR ZIEMER: And this is a --
10 this is a reference out of Rocky Flats, right?

11 MEMBER POSTON: Is that available?
12 I mean, I couldn't get it based on this
13 action.

14 MR. THURBER: I think we -- I think
15 it's available. I think we have it.

16 CHAIR ZIEMER: It doesn't have --
17 it doesn't have a report number or an actual
18 location. It deals with Rocky Flats, but it
19 doesn't say, you know, is it an AEC document,
20 a Rocky document. What -- do we know what it
21 is?

22 DR. ANIGSTEIN: It's not, I mean,

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1 it's not something you can get on the web.

2 MEMBER MUNN: Well, if it's easily

3 --

4 DR. ANIGSTEIN: It was in the --

5 MEMBER MUNN: But if it doesn't
6 make any sense for the ordinary reader, then
7 why is it duplicated there?

8 CHAIR ZIEMER: This is Wanda Munn
9 speaking. Say it again, Wanda. DR.

10 ANIGSTEIN: Did you want to repeat that?

11 CHAIR ZIEMER: We could barely
12 hear you there.

13 MEMBER MUNN: I said it can't be
14 that long a reference, for goodness sake, and
15 if it's difficult for people who are ordinary
16 readers to find the document, just cite the
17 document and repeat it there. It shouldn't be
18 that difficult for us to just repeat a
19 reference. An excerpt from the reference can
20 become a portion of this report. That's my
21 point.

22 CHAIR ZIEMER: Okay, Bob?

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1 DR. ANIGSTEIN: I was the one who
2 put that in. It's not -- it's not a publicly
3 available document, so it can only be --

4 CHAIR ZIEMER: Is it classified?

5 DR. ANIGSTEIN: No, it's not
6 classified. It's just, you know, it's just
7 one of those internal reports --

8 CHAIR ZIEMER: Internal report.

9 DR. ANIGSTEIN: -- that's not --
10 that simply a member of the public cannot go
11 to the library and get it.

12 MEMBER POSTON: But we're not
13 members of the public.

14 DR. ANIGSTEIN: Pardon?

15 MEMBER POSTON: We're not members
16 of the public.

17 DR. ANIGSTEIN: No, but an ordinary
18 --

19 DR. MAURO: Does anybody want a
20 copy?

21 MEMBER POSTON: Bob, look, on
22 Reference 1 you've got the AEC document number

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1 and so on. Based on my experience at Oak
2 Ridge for 13 years, we never post anything
3 that didn't have some sort of number on it,
4 whether it was a TM or whether it was a report
5 or what it was, and I can't find the document
6 based on what you've given me here.

7 DR. MAURO: We will provide any
8 documents anyone wants. Our apologies for not
9 making the complete reference.

10 CHAIR ZIEMER: Now, there must be
11 some other identifier as to who published it,
12 you know.

13 DR. ANIGSTEIN: It wasn't
14 published. That was the whole point.

15 CHAIR ZIEMER: Well, even if it's
16 an internal document, you know, a Rocky Flats
17 report. You know, is it a letter report or --

18 MEMBER POSTON: Could be a TM.

19 CHAIR ZIEMER: How would somebody
20 track it down?

21 DR. NETON: Anigstein, how did you
22 come about this document?

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1 DR. ANIGSTEIN: I got it out of the
2 Mallinckrodt TBD.

3 DR. NETON: Off the Mallinckrodt
4 TBD?

5 DR. ANIGSTEIN: Yes.

6 DR. NETON: But the reference to
7 the document --

8 DR. ANIGSTEIN: Pardon? Yes, I
9 mean, there is a reference.

10 DR. NETON: How did you obtain a
11 copy of the document?

12 DR. ANIGSTEIN: Pardon? Good
13 question.

14 DR. MAURO: We'll track it down.

15 DR. ANIGSTEIN: Through internal, I
16 mean, through NIOSH.

17 CHAIR ZIEMER: He's not revealing
18 his source.

19 DR. NETON: My suspicion is it's on
20 our site research database.

21 DR. ANIGSTEIN: Yes, I'm sure,
22 probably, yes.

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1 DR. NETON: And we would have it.

2 CHAIR ZIEMER: Okay, we need to
3 track that down, but, now, so I want to get
4 some clarity here, though, on where we are on
5 this. Does this mean that the issue is open
6 until this is revised? I think we can't close
7 this until we see what the revision is, and in
8 the system, what does that do? It puts it in
9 abeyance.

10 DR. MAURO: If that's how you would
11 like to handle it. This was each Work Group
12 --

13 CHAIR ZIEMER: Right, but I think
14 we want to be consistent with how the other
15 work groups -- it appears that both SC&A and
16 NIOSH agree, and I'm asking if the Work Group
17 members agree that this issue needs to be
18 addressed in the document itself, and then if
19 we believe that it's appropriately addressed,
20 then we can close the item. I mean, the
21 finding was you need to discuss this in the
22 generic document.

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1 MEMBER POSTON: That's fine with
2 me. I agree.

3 CHAIR ZIEMER: Right.

4 MEMBER BEACH: I agree, also.

5 CHAIR ZIEMER: Yes. Josie. Wanda,
6 you're in agreement with that?

7 MEMBER MUNN: I'm in agreement that
8 we should indeed say this is, for all intents
9 and purposes, closed. However, it's being
10 held in abeyance.

11 CHAIR ZIEMER: Well, right,
12 abeyance.

13 MEMBER MUNN: Yes, abeyance until
14 the completion of whatever documentation --

15 CHAIR ZIEMER: And the task from
16 here would be, I think, to NIOSH to revise
17 that section or whatever we need to do.

18 DR. NETON: Evaluate it.

19 CHAIR ZIEMER: Yes, evaluate.

20 DR. ANIGSTEIN: If I can interject.

21 CHAIR ZIEMER: Yes, Bob.

22 DR. ANIGSTEIN: The more -- the

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1 more complete reference, which one was the
2 Putzier report, simply identifies it as Rocky
3 Flats Plant. That's the only additional
4 information on that report. It was left out
5 here.

6 CHAIR ZIEMER: Yes, well, and,
7 actually, the title includes that, A Summary
8 of Experience and Observations at Rocky Flats
9 Plant Over Thirty Years.

10 DR. ANIGSTEIN: Right.

11 CHAIR ZIEMER: So --

12 DR. ANIGSTEIN: That's all there
13 was. That was all there was on the cover. On
14 the cover of the thing, that's all it said.

15 CHAIR ZIEMER: It must have been in
16 the database, then.

17 DR. ANIGSTEIN: Yes.

18 CHAIR ZIEMER: We'll need to
19 confirm where it is so that when -- how is
20 that done when we reference these things? I
21 mean, you must have captured it out of the
22 Rocky Flats.

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1 DR. NETON: Yes. Apparently,
2 there's an incomplete citation in the document
3 itself, so we'll go back and look at it and
4 shore that up.

5 DR. MAURO: Would anyone like
6 copies of that, though? I mean, John, it
7 sounds like you'd like a copy.

8 MR. ALLEN: If you have an
9 electronic copy, it might be easiest if you'd
10 email that to me, and I'll put it on the
11 website or the O-drive.

12 DR. ANIGSTEIN: It came from there
13 in the first place. That's what we --

14 MR. ALLEN: Yes, I know, but
15 sometimes it's hard to find.

16 DR. ANIGSTEIN: We got it - we did
17 not dig it up ourselves. We found it on --

18 CHAIR ZIEMER: This is a 30-year
19 summary. It must be a report that has a lot
20 of things in it. Like is this a chapter, or
21 is there a page number or something that could
22 be cited? This --

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1 MR. THURBER: This was basically
2 kind of a guy who worked in health physics,
3 memoirs of what he had seen while he was
4 working at Rocky Flats. It was kind of his
5 personal journal.

6 MEMBER MUNN: So is there any
7 problem with --

8 CHAIR ZIEMER: I think that was --
9 was that Bill Thurber?

10 MR. THURBER: Yes, it's Bill
11 Thurber.

12 CHAIR ZIEMER: Yes. Thanks, Bill.
13 Okay, we're -- I think we're good on that.
14 Is there another comment? Wanda?

15 MEMBER MUNN: I still can't
16 understand why there would be a problem. It
17 shouldn't be a bulky or a lengthy excerpt.
18 Why not just simply repeat the excerpt and
19 indicate what it's excerpted from?

20 CHAIR ZIEMER: Well, we'll have to
21 go back and look and see what it is. It could
22 be -- it could be a single page. It could be

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1 a paragraph, a sentence.

2 MEMBER BEACH: Well, wasn't it
3 meant to be a reference for NIOSH to look at
4 if they wanted to? I mean, that's the way I
5 read it.

6 DR. NETON: For our information.

7 MEMBER BEACH: Yes.

8 MEMBER MUNN: But I'm thinking in
9 terms of long-term, five years from now,
10 individuals referencing --

11 CHAIR ZIEMER: How do we go back?

12 MEMBER MUNN: -- the material and
13 trying to track it down again.

14 CHAIR ZIEMER: Yes.

15 MEMBER MUNN: If it's a difficult
16 thing for people to locate, there's no reason
17 why it -- it would be much simpler to just
18 simply excerpt the information that's
19 applicable and incorporate it into the report.

20 CHAIR ZIEMER: Very good. Any
21 other comments on Issue 1? If not, we're
22 going to go on to Issue 2. Issue 2 carries

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1 the title, Omission of External Exposure to
2 Skin from Beta Particles Emitted from
3 Contaminated Surfaces, and the SC&A finding
4 was, the TBD presents generic photon exposure
5 conversion factors for submersion in an
6 airborne plume of uranium expressed in units
7 of mR/hr per dpm alpha per cubic meter and for
8 standing on a contaminated surface (expressed
9 in units of mR/hr per dpm alpha per square
10 meter).

11 However, the TBD does not present
12 similar dose conversion factors addressing
13 external exposure to skin from beta particles
14 emitted from contaminated surfaces. SC&A's
15 calculations of the potential skin exposure
16 from this pathway reveal that this source of
17 exposure is significant relative to photon
18 exposures and should be addressed in the TBD
19 and NIOSH.

20 MR. ALLEN: And in our response to
21 her we wrote that, yes, we agree that the beta
22 dose was not included in that source term and

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1 it should be, and we're going to calculate
2 that out, and that'll be included in the next
3 row.

4 DR. NETON: Recognizing it's a
5 fairly small contribution, but for
6 completeness --

7 DR. ANIGSTEIN: Under certain
8 circumstances, it's small.

9 DR. NETON: Most circumstances.

10 DR. MAURO: Relative to the metal.
11 Right, relative to the metal, but if there's
12 no metal and you've got that --

13 DR. ANIGSTEIN: Is that the only --

14 DR. NETON: -- it's still small.

15 DR. ANIGSTEIN: If there's no metal
16 there, it's very small.

17 DR. MAURO: Still small, okay.

18 CHAIR ZIEMER: Well, so adding it
19 is simply, I think, in NIOSH's mind, just
20 recognizing that we took it into
21 consideration, and we didn't -- we didn't
22 neglect to look at it. Is that --

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1 DR. NETON: I think we need to
2 include it in there.

3 CHAIR ZIEMER: But I'm saying that
4 what you're saying is, yes, we'll add it so
5 that it's clear that we did consider this,
6 even though it's small, or do we know that?

7 MR. ALLEN: Yes, I mean, right now
8 it has the photon dose from surface
9 contamination, which is going to be even
10 smaller than the beta dose. It leaves out the
11 beta dose, so it's a real inconsistency in a
12 small dose.

13 CHAIR ZIEMER: Right.

14 DR. MAURO: You have to put the
15 photon but not the beta for the skin. You
16 understand. It's just -- really, when we
17 brought it up it was a completeness issue.
18 Seems to me there's one little scenario here
19 that needs to be closed out.

20 DR. NETON: I have no problem with
21 it.

22 CHAIR ZIEMER: So what would happen

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1 here then is just a revision where you would
2 -- would this be a full analysis of the
3 contribution?

4 DR. NETON: Yes, the beta dose
5 would be addressed.

6 DR. MAURO: The original -- the
7 report in its current form is very convenient
8 in terms it gives -- unitized dose conversion
9 factors for various exposure scenarios, but,
10 you know, everything is normalized to some
11 unit concentration, whether it's in air or on
12 surfaces, and this would be just adding
13 another table with the unitized dose
14 conversion factors so that the dose
15 reconstructor would have that available to him
16 when implementing this particular procedure.

17 CHAIR ZIEMER: So the action item
18 here, this would then go into abeyance in a
19 similar fashion. Let's see if there's any
20 questions, though, from the Work Group on --
21 so basically NIOSH is agreeing that they would
22 add a section to address beta dose. No

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1 comments or questions? Okay, so in abeyance.
2 Wanda?

3 MEMBER MUNN: In abeyance.

4 CHAIR ZIEMER: You're good. I want
5 to check again, see if Mark Griffon came on
6 the line yet. Apparently not. Okay.

7 Issue 3, called, Questions
8 Regarding Recycled Uranium. SC&A finding,
9 based on this review, we conclude that the
10 default concentrations of plutonium-239,
11 neptunium-237, and technetium-99 contained in
12 recycled uranium shipped to AWE facilities for
13 metal working as presented in TBD 6000 are
14 scientifically valid and claimant favorable.
15 However, we do not understand the reason for
16 including thorium-232 and thorium-228 in Table
17 3 of TBD 6000.

18 Furthermore, a default assumption
19 that RU was present during and after 1953 is
20 appropriate unless there is specific evidence
21 from an AWE site's own records that only
22 virgin uranium was handled there. Okay, and

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1 NIOSH response is?

2 MR. ALLEN: We respond that we're
3 still tracking down the origin of that thorium
4 value. We still can't quite sort out exactly
5 where that started. As far as the rest of
6 this goes, seems the comment was that they
7 agreed with the rest of the recycled, that it
8 was -- claimant favorable.

9 They don't understand the origin of
10 the thorium, and neither do I, and it wasn't
11 clear. The last comment was that it wasn't
12 clear if the TBD's default was to include
13 recycled uranium, and I thought it was, but,
14 you know, you can have differences of opinion
15 there.

16 Section 7.1.3 in the TBD mentions
17 the other assumptions for internal dose, one
18 of which is recycled uranium, and it says that
19 -- it essentially says the default is to
20 assume recycled uranium unless you know
21 otherwise for that facility after 1953, so I
22 don't know if, you know, if that's clear

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1 enough. I don't know if we're in disagreement
2 whether that piece is clear or that was
3 missed.

4 CHAIR ZIEMER: So if you found out
5 specifically that there was thorium at one of
6 these facilities, then you would handle that
7 specifically in the appendix for that facility
8 rather than here, or what?

9 MR. ALLEN: Well, I mean, as far as
10 the thorium.

11 DR. NETON: There are two issues.
12 One is what's the default for handling
13 recycled uranium in general. I think Dave has
14 suggested we believe that it's very clear in
15 our mind that it's anything after 55 is
16 recycled unless you know otherwise.

17 The second issue is why we include
18 a dose component from thorium-232 and 228 in
19 our recycled uranium calculations, and Dave is
20 saying he's not sure why that's in there,
21 either.

22 MR. ALLEN: Very small number in

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1 there.

2 DR. NETON: Very small number. It
3 must -- yes, I don't know why, you know.
4 Thorium-232 has nothing to do with recycled
5 uranium, so I'm not sure why it would be in
6 there, either. We could argue it's kind of
7 favorable, I suppose.

8 DR. ANIGSTEIN: Wasn't there some
9 experiments done at Fernald at one time where
10 they were trying to have mixed thorium and
11 uranium, you know, as reactor fuel?

12 DR. NETON: I think there was
13 something like that, but I --

14 DR. ANIGSTEIN: In which case it
15 might have crept into the supply.

16 DR. NETON: None of the recycle
17 documents I've seen talk about thorium-232.

18 CHAIR ZIEMER: So we don't even
19 know where this even arose in the --

20 MR. ALLEN: I'm still trying to
21 track it down. I tracked it down like two
22 documents, but, you know, where it came from

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1 for the TBD and where it came from for that
2 document, but it's like a daisy chain of
3 documents I'm tracking down.

4 CHAIR ZIEMER: Who were the authors
5 of the TBD?

6 MR. ALLEN: Battelle was this one,
7 and I got them on the phone. We don't have --

8 CHAIR ZIEMER: Oh, okay.

9 MR. ALLEN: -- any contact anymore,
10 but I've been corresponding with them a
11 little.

12 CHAIR ZIEMER: So that was during
13 that period where they were doing a number of
14 special --

15 DR. NETON: Right. All the 6000
16 series were originally drafted by Battelle.

17 MEMBER POSTON: And the only
18 thorium and uranium that I'm aware of was
19 Indian Point 1, the first core in Indian Point
20 1 with the thorium, but that fuel was
21 processed at West Valley.

22 DR. NETON: Well, I mean, worst

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1 case is we remove it.

2 MR. ALLEN: Yes. In all honesty,
3 the numbers in there, it's not going to come
4 up to 1 millirem a year for any organ, I don't
5 think. I haven't actually run those numbers.

6 There's a very -- it's -- what did I write in
7 here, less than six billionths of the uranium
8 activity? It's a very small fraction. If
9 that became significant, then the uranium
10 should be more than enough compensation.

11 MEMBER MUNN: This is Wanda. In
12 considering the complex inventory, that's got
13 to be such a small figure that it would be
14 almost indistinguishable.

15 DR. MAURO: Wanda, this is John.
16 The only reason we brought it up is that we
17 were surprised to see it there and not that we
18 were making any statement that it was
19 significant by any means.

20 MEMBER MUNN: Yes, well, I can
21 understand why it would be surprising to be
22 there. Definitely.

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1 CHAIR ZIEMER: At this point, the
2 only question then is whether to even leave it
3 there, I guess, or to make an additional
4 comment on it.

5 MR. ALLEN: Well, I think, you
6 know, whatever the Work Group decides, I kind
7 of want to track that down as to where it came
8 from.

9 CHAIR ZIEMER: Yes, you need --
10 yes, if there is some other basis for it, then
11 --

12 MR. ALLEN: Either way, I'm with
13 John. I was kind of surprised to see that
14 there, too, and I suspect the resolution is
15 going to be to remove that. It's trivial.

16 CHAIR ZIEMER: Yes, either way.

17 DR. NETON: Sounds like we've got
18 half of this comment addressed, so the second
19 part, which is the default assumption of
20 recycled uranium, I think John agrees that
21 it's not an issue, and the first part was
22 agreement with the value, so I don't know how

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1 SC&A feels, but I'm almost going to close this
2 and take --

3 DR. MAURO: That's my
4 recommendation. You know, we just want -- we
5 weren't sure -- I guess we should have been --
6 regarding your default posture, and it sounds
7 like your default posture is exactly what we
8 thought it should be, and that issue, as far
9 as we're concerned --

10 CHAIR ZIEMER: So we are okay --

11 DR. MAURO: We're okay on that.

12 CHAIR ZIEMER: -- as far as you're
13 concerned.

14 DR. MAURO: Yes.

15 CHAIR ZIEMER: Well, NIOSH is it
16 your intent, though -- once you find out where
17 it came from, then what happens?

18 MR. ALLEN: When we find out, I
19 suspect it's going to be to delete those.

20 CHAIR ZIEMER: But it's not --

21 MR. ALLEN: We would not revise the
22 documents.

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1 CHAIR ZIEMER: It's not going to
2 change anything. Is there any reason to keep
3 it in abeyance is what I'm asking.

4 MR. ALLEN: In my opinion, no.

5 CHAIR ZIEMER: Josie?

6 MEMBER BEACH: I don't believe so.

7 CHAIR ZIEMER: You want to close?
8 John, should we close it? Wanda, we're
9 talking closure.

10 MEMBER MUNN: I'd like to close the
11 item, but I don't know any process that we
12 have for tracking our follow-up to assure that
13 Battelle actually does not have some data
14 source that we have overlooked. That would be
15 my only concern is making sure that that last
16 T gets crossed. I don't know how we do that
17 once we no longer have --

18 CHAIR ZIEMER: Without leaving it
19 in abeyance?

20 MEMBER MUNN: In abeyance until we
21 can identify -- until Battelle responds to our
22 request for information, essentially.

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1 CHAIR ZIEMER: Well, I guess we
2 could leave it in abeyance and just have you
3 report what you found.

4 MEMBER MUNN: Yes.

5 CHAIR ZIEMER: We could do that.

6 MEMBER MUNN: Yes, and one last
7 time look at it and say, now we know this. It
8 can be closed.

9 MR. ALLEN: I can do that, but,
10 like I said, it seems to be somewhat of a
11 daisy chain, and I can't guarantee I'm going
12 to find exactly where that came from.

13 CHAIR ZIEMER: Well, if you don't,
14 then what?

15 MR. ALLEN: Well, that's my
16 question is everybody wants --

17 CHAIR ZIEMER: Any reason not to
18 remove it?

19 MR. ALLEN: I mean, is this a T you
20 really want crossed is essentially what it
21 amounts to, or are we willing just to drop it?

22 MEMBER MUNN: Well, if the

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1 originator of the data cannot provide for you
2 the basis of inclusion, then we have a basis
3 for exclusion.

4 CHAIR ZIEMER: Well, the other part
5 of that is that they're not even sure they can
6 find the originator, right? It somehow came
7 from a subcontractor who --

8 MR. ALLEN: I've got to track down
9 with a group of people that don't work for us
10 anymore.

11 CHAIR ZIEMER: Okay.

12 MR. ALLEN: Obviously, they're not
13 on our timelines.

14 CHAIR ZIEMER: Let's track it down.
15 Wanda is suggesting leave it in abeyance
16 until we -- just to hear what the final
17 outcome is, I guess, is --

18 MEMBER POSTON: That's fine.

19 CHAIR ZIEMER: That's fine. Okay.

20 MEMBER BEACH: That's fine.

21 CHAIR ZIEMER: I'm okay on that.

22 We'll leave it in abeyance just so we can find

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1 out the ultimate --

2 MEMBER MUNN: Yes, I just don't
3 know of another way to make --

4 CHAIR ZIEMER: We're going to
5 consider it -- the issue is essentially
6 closed. We just --

7 MEMBER POSTON: Let's hope all of
8 them don't drop at once.

9 CHAIR ZIEMER: Okay, we can move
10 on. I think we're up to Issue 4, airborne
11 uranium concentrations recommended in the TBD
12 might not be claimant favorable.

13 SC&A finding, default airborne dust
14 loadings used in the TBD to drive external
15 exposures and inhalation exposures are based
16 on data provided in Harris and Kingsley, 1959.

17 The TBD would benefit from including a review
18 of the time-weighted daily average uranium
19 dust loadings reported in the Adley, et al.
20 Report, Study of Atmospheric Contamination in
21 the Metal Melt Building, (AEC 1952), and in
22 the site profile for Simonds Saw and Steel,

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1 ORAUT-TKBS-0032 (ORAUT 2005).

2 SC&A's review of these documents
3 reveal that the bounding default time-weighted
4 average airborne uranium dust concentrations
5 recommended in the TBD might not be claimant
6 favorable. Okay, NIOSH.

7 MR. ALLEN: Okay, this is one that
8 I don't know if I understand the details on
9 it. In the report from SC&A they listed
10 Simonds Saw. It says this in this comment
11 here and the Adley document, and they list
12 several values and even mention here, I think,
13 somewhere that it may be two or three times
14 higher, or maybe I missed that.

15 DR. MAURO: That's correct.

16 MR. ALLEN: It seems like -- you
17 know, I haven't seen the numbers, but it seems
18 like it's being compared to the value in the
19 table and the TBD, but the table is the
20 geometric means of distribution.

21 There's a default GSD on those of
22 five, which puts even the 84th percentile

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1 fives times in it, so the, you know, the
2 values that are two or three times that would
3 then be something less than an 84th
4 percentile. It seems like the TBD values are
5 a distribution that well covers the values
6 that you're mentioning in these other
7 documents.

8 DR. MAURO: Our concern is the
9 Adley report is a very rich source of
10 information on dust loadings and practices for
11 uranium handling facilities. The Kingsley and
12 Harris report is certainly a useful document.

13 What we did when we reviewed the
14 document was we looked at the Harris and
15 Kingsley numbers. We looked at the Adley
16 numbers, and we found that, you know, they
17 both deal with time-weighted averages, and
18 tried to characterize the range of different
19 types of airborne dust loading that you might
20 see, time-weighted averages, and we found
21 that, when we looked at these other documents
22 over and above Kingsley, there was a richness

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1 of data which indicated that, to really tell
2 the story, a complete story, and to draw from
3 the wealth of information you have, you should
4 have looked at those other documents and weigh
5 that in.

6 When we looked at the other
7 documents, we walked away, saying, I could
8 have easily come away with a default
9 concentration that could have been twice as
10 high. I mean, that's how it comes out.

11 Now, you bring up some points about
12 operating off the geometric mean, the
13 geometric standard deviation, 95th percentile,
14 all of which I say, you know, that's fine, but
15 I would -- and I can't say sitting here that
16 that somehow will not do the trick.

17 What is, quite frankly, disturbing
18 is that Adley and Simonds Saw are a very
19 important source of all data for operations at
20 these types of facilities, and they certainly
21 should have been part of the milieu that you
22 drew upon in coming to the numbers you

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1 selected, and I have to say, thinking back to
2 when I first looked at it, I felt that, gee, I
3 might have come away with numbers a little bit
4 higher than yours if I were picking generic
5 numbers for, you know, for the TBD.

6 MR. ALLEN: Well, I mean, the issue
7 when this was being developed was that there
8 was a number of data sources out there, and
9 the concept of trying to take all those,
10 correlate one operation with, you know, what
11 we can pick out of this report versus what we
12 can pick out of that report, and developing a
13 distribution about those things. As I
14 remember, when they found this Harris and
15 Kingsley, it was a very rich source itself.

16 DR. MAURO: It's a great report,
17 but I would say Adley is even better.

18 MR. ALLEN: And they determined
19 that if they put this generic GSD 05 on there
20 using Harris and Kingsley, they essentially
21 looked at some of the other references and
22 determined that this distribution would

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1 encompass all of those, and, no, they didn't
2 do a statistical analysis.

3 You know, they were trying to avoid
4 having to do a statistical analysis and trying
5 to correlate all of this stuff together. That
6 can be done. As you mentioned, I suspect the
7 distribution is going to go down, because we
8 haven't found anything that's really above
9 even the 84th percentile on those
10 distributions right now, but I haven't looked
11 at each and every document, or all the
12 sources.

13 DR. MAURO: I think Adley should be
14 one of the rocks you stand on. In other
15 words, when dealing with AWE facilities, I
16 tried to get an appreciation of how airborne
17 activity behaved to produce settled levels for
18 different operations.

19 It is truly an amazing document,
20 and we came across it in the past. I forget
21 under what circumstances, but it's been around
22 for quite some time, and I think that TBD

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1 6000, prior to TBD 6000, without bringing
2 Adley into the picture, and perhaps also
3 Simonds Saw, seems to be a significant
4 deficiency.

5 DR. NETON: Okay. It sounds to me
6 like we ought to at least review the Adley
7 document, compare our numbers that were
8 generated against Adley, make some reference
9 to the fact that we've done that if, indeed,
10 our numbers appear to be significantly
11 bounding given what we've done, but you're
12 right.

13 I mean Adley is a very, you know,
14 well researched compendium. Refresh my
15 memory, though. Is Adley the one that was
16 specific for just the Hanford facilities?

17 DR. MAURO: Right. It was a --

18 DR. NETON: That was my concern.
19 Was it one facility, one building, very
20 controlled circumstances? You start using
21 that and saying, okay, this is essentially
22 surrogate data that's going to be used

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1 complex-wide. Then you raise the questions
2 about ventilation rates and all these other
3 issues, and I think to hang our analyses on
4 just that one document might be a little bit
5 too narrow.

6 DR. MAURO: Oh, I didn't say
7 should. I'm saying that given the stature in
8 terms of -- you saw the work they did in
9 there. It was -- I was -- when I read that, I
10 said -- because they looked at every different
11 aspect of operation.

12 DR. NETON: That's true, I mean,
13 but the Kingsley Harris one was more of a
14 survey of different operations. So you've got
15 -- you've got sort of a sampling of the
16 complex versus a single facility that was
17 under controlled environment.

18 DR. MAURO: We critiqued. I mean,
19 we're looking at the matrix, but we do have
20 some concerns with Kingsley and Harris,
21 because it represents at least seven
22 facilities where they went in on one day at

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1 one facility and pulled some samples, so it's
2 a very, very small snapshot, so in itself, it
3 suffers from that.

4 Bringing Adley in and bringing
5 Simonds Saw in starts to build a foundation
6 that's saying, now we've got some data. You
7 know, right now Harris alone is very thin.

8 DR. NETON: It's thin, but I think
9 that's why they ended up with GSD 05 to just
10 sort of account for that, and then possibly my
11 thinking would be maybe use the Adley and the
12 other documents as sort of --

13 DR. MAURO: To reinforce?

14 DR. NETON: Not necessarily
15 validation, but checks, that sort of thing.

16 DR. MAURO: You see, to me, the way
17 I see it is, okay, you've got -- let's say you
18 want to stay with Adley as your base, but then
19 you test it, say, okay, but wait a minute. We
20 have this great study done by Adley. We've
21 got this great work done at Simonds Saw, which
22 -- and we're talking about the same periods,

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1 you know, late 1940s, early 50s. Let's test
2 Adley. I'm sorry. Let's test Kingsley.

3 DR. NETON: Kingsley, yes.

4 DR. MAURO: Let's test Kingsley
5 against it and see how it holds up.

6 DR. NETON: That's what Dave is
7 suggesting. I mean, the 84th percentile is
8 well above anything that's reported here.

9 DR. MAURO: Yes, and I think that's
10 all we're looking for.

11 DR. NETON: I think that's fine.

12 DR. MAURO: Especially given the
13 thinness of Kingsley.

14 DR. NETON: I think, to close the
15 loop, I don't think we have a problem.

16 MEMBER POSTON: The scientific
17 method says you use everything, so even if
18 they think the estimates are conservative,
19 that's fine.

20 CHAIR ZIEMER: So you're just
21 saying, demonstrate that that's the case.

22 DR. MAURO: Holds up.

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1 CHAIR ZIEMER: And it holds up.
2 Did the GSD 05 emerge arbitrarily from just
3 looking at the data and its own -- was that
4 the actual GSD from all their data sets?

5 MR. ALLEN: No, it wasn't the
6 actual GSD. It came from Battelle-TIB-5000,
7 and it was essentially a generic GSD for
8 general air samples or --

9 CHAIR ZIEMER: That's a pretty big
10 spread.

11 MR. ALLEN: I can't remember.

12 CHAIR ZIEMER: And it's very hard
13 to say that that's almost always claimant
14 favorable. That really --

15 DR. NETON: Well, the answer's in
16 there somewhere.

17 CHAIR ZIEMER: Well, I mean --

18 DR. NETON: That's the basis. I
19 mean, that's --

20 CHAIR ZIEMER: Right.

21 DR. NETON: It has been shown to
22 cover that kind of rate. Particularly, it

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1 sounds enormous, but if you start with some
2 very small numbers, it doesn't take much to
3 get, you know, to five.

4 DR. MAURO: Let's talk a little bit
5 more. I think that there's some philosophy
6 strategy. In other words, when you've got
7 these different operations, there are a lot of
8 different types of operations that take place
9 in these metal handling facilities, some of
10 which, the dust loadings like at the furnace
11 where they have -- there are certain
12 operations that we know from Bethlehem Steel,
13 the Roller Number 1, the famous Roller Number
14 1, where the levels are very -- could be very
15 high for prolonged period of times.

16 Now, the idea that you would have
17 -- let's say, you know, you grab a work
18 category, and it sounds like I have to go back
19 and look, and you assign a GSD 05. To me, you
20 know, if it turns out that that's a way of
21 saying, well, it's got such a big GSD, that
22 takes care of all ills, I have to say my sense

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1 is that doesn't really solve the problem,
2 because if you're saying --

3 Is it possible that what we really
4 have here is some -- because you're going to
5 apply this to a real person, and somehow your
6 sense is, well, because we're using a GSD 05,
7 we are being claimant favorable for that
8 person.

9 What happens if that person's
10 reality of his work situation was he was up in
11 the upper 85 percentile, 95 percentile his
12 whole working career? Does that GSD 05 assure
13 him that you're being claimant favorable? So
14 I've always had trouble with the use of a very
15 large spread as being, you know, a way to deal
16 with the problem. It's almost a little too
17 easy.

18 DR. NETON: Our opinion accounts
19 for the uncertainty in our knowledge base.
20 That's what this whole Monte Carlo program
21 does. It's based on that --

22 DR. MAURO: I would agree with that

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1 if you felt you had a guy who -- see, I would
2 have -- see, we've been down this road, but I
3 think it's worth repeating, because it's a way
4 of thinking about the problem.

5 If you know you had a guy whose job
6 was he was a supervisor and he roamed around
7 the building, and he experienced a
8 cross-section, and you don't know how much he
9 -- you know, then you, you know, you know he
10 had sort of an essential tendency, but it
11 could have been out there.

12 But if you don't know that, and you
13 say, gee, he could have been working anywhere.

14 For all we know, he could have been working
15 in the worst possible place, I don't -- to me,
16 then, that one-size-fits-all, that's when it
17 starts to fall apart, because if either you
18 know the person worked in a bad place, or you
19 don't know that he did, and we ran into this
20 before, and I think that --

21 I know how we resolved it on
22 Bethlehem Steel, and we liked the way it was

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1 resolved. In other words, you ended up
2 sighing, well listen, we don't know where this
3 guy worked, so what we're going to do is we're
4 going to -- since we don't know, we're going
5 to put him in the worst place, and assign to
6 him that 1,000 MAC or whatever the number was,
7 600 MAC.

8 So anyway, but this does play on --
9 the philosophy plays out here, because when
10 you look at your default value, which this is
11 intended to be, you know, this is going to be
12 a one-size-fits-all by compartment, but you
13 know, the fact that you would assign a GSD 05,
14 whether or not that holds up well when you
15 start to weigh it against the kinds of numbers
16 that come back from Adley, I'd be very
17 interested in seeing.

18 DR. NETON: That's fair, I mean, we
19 already do that, but you know, I think we have
20 to go with our best estimate. I mean, the law
21 requires us to do a reasonable estimate versus
22 dose, and the reasonable estimate is the best

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1 estimate with the uncertainty associated with
2 it, in my opinion. We've been down this
3 before.

4 DR. MAURO: I know.

5 DR. NETON: We're sort of getting
6 into a sort of different issue here, and it's
7 not relevant to this comment. I mean, it's a
8 real issue, and it needs to be properly
9 addressed, but maybe in another forum.

10 CHAIR ZIEMER: Right, because all
11 of your methodologies, whether it's for the
12 internal or even the external, you always have
13 an outside chance that there could be somebody
14 who you will miss.

15 DR. NETON: Yes, I mean, frankly,
16 even if you pick the 95th percentile, you're
17 taking a five percent chance that you --

18 DR. MAURO: The reason why I'm okay
19 -- even with the end where we're talking
20 external, why I always was comfortable, you've
21 got a thousand workers working in your plant,
22 and you have a distribution of numbers, and

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1 you decide, well, we're going to assign the
2 95th percentile for this guy in this year.

3 Well, reality is you're right. For
4 that year, it's possible there's a five
5 percent chance that his dose for that year
6 might be higher, if you don't know any better,
7 but I'm comfortable with the idea that, well,
8 wait a minute. You're going to assign the
9 95th percentile for your number one, your
10 number two, your number three.

11 Now, I am convinced. We know now
12 that the likelihood that this guy is going to
13 be hit with the 95th percentile year after
14 year after year after year. Things get kind
15 of slim. Now I'm convinced that you just
16 placed an upper bound. It really is
17 unreasonable to think it could be higher, so
18 that's why, you know, to me the philosophy
19 that you've embraced for external exposure is
20 truly bounding.

21 Now but that philosophy doesn't
22 seem to be carrying over when it comes to

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1 internal exposure. You've taken a different
2 tack, and I believe the reason you've taken
3 that tack is because you're talking about an
4 integrated exposure, and that the people that
5 were selected for --

6 Well, in other words, to this day
7 we've been having this conversation, you know,
8 why -- the rationale for taking a different
9 tack for internal versus external, and it does
10 bear out here. Here's a place where the
11 rubber meets the road, so that when you start
12 to, let's say, take a closer look at TBD 6000
13 in light of these other sources of data, I
14 think it's also important to be thinking in
15 terms of the subject of, you know, how do you
16 come out of a problem like this, and right now
17 I do think we have a difference of opinion on
18 how to come out of this kind of problem.

19 CHAIR ZIEMER: But isn't it still
20 integrated? You're still looking -- you're
21 taking the dose commitment for this year, and
22 the next year, and the next year, and the next

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1 year.

2 DR. MAURO: The full distribution,
3 right. In other words, for this year, here's
4 the intake we're going to assign, and here's
5 the distribution for this year, and it's the
6 full distribution, right, and then the next
7 year, the full distribution. See I would
8 claim -- I would argue that's claimant
9 neutral.

10 DR. NETON: I don't see that as a
11 comment in this review.

12 DR. MAURO: No, it's not here. No,
13 it's not here. I apologize for that, but,
14 right, let's keep it here as far as we're
15 concerned.

16 CHAIR ZIEMER: That's sort of
17 underlying your concern, is what you're
18 saying.

19 DR. MAURO: That's part of it, yes.
20 That's part of it. Well, and we don't have
21 to engage it here, but I do think we see this
22 time and again, and I think it does come out

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1 in the TBD that you had mentioned, the 050 or
2 the --

3 MR. ALLEN: TIB-5000.

4 DR. MAURO: TIB-5000, yes, so maybe
5 that's where it should be, but right now as
6 far as we're concerned, for TBD 6000, our only
7 concern is that Adley and Simonds Saw, the
8 data be factored in for all values.

9 DR. NETON: And we've agreed.

10 DR. MAURO: And that's enough, yes.

11 CHAIR ZIEMER: So the action will
12 be for NIOSH to review the Adley document,
13 compare it to the Harris and Kingsley and the
14 Simonds Saw data, and validate that your
15 approach with the Harris and Kingsley data
16 either is encompassing or not B-

17 DR. NETON: Bounding.

18 CHAIR ZIEMER: -- or bounding.

19 Okay, so B-

20 MEMBER BEACH: Is that going to be
21 a white paper, or just a simple paragraph, or
22 how's --

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1 CHAIR ZIEMER: Do we know what form
2 that will take at this point?

3 MR. ALLEN: I guess the form is
4 whatever you would like to see. I'm thinking
5 white paper right now, if you just want to see
6 an evaluation of these.

7 CHAIR ZIEMER: You're going to have
8 some sort of analysis, which will be the basis
9 of response to the reply, I guess.

10 DR. NETON: Yes.

11 CHAIR ZIEMER: So it sounds like a
12 white paper or a report.

13 DR. NETON: Eventually that --
14 pieces of that white paper would more than
15 likely be incorporated into this TBD --

16 CHAIR ZIEMER: Right.

17 DR. NETON: -- because we've done
18 the work. We may as well take credit for it
19 in the document, but I think it's best to
20 flesh it out as a white paper first.

21 CHAIR ZIEMER: Right. So this, in
22 our categorical scheme, this continues as --

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1 what's the proper term for --

2 DR. MAURO: It's open.

3 CHAIR ZIEMER: It's open.

4 DR. MAURO: Open and active.

5 CHAIR ZIEMER: So it stays open.

6 DR. MAURO: Open and active, yes.

7 CHAIR ZIEMER: Wanda, any comments
8 on this?

9 MEMBER MUNN: No, I think you're on
10 the right track.

11 CHAIR ZIEMER: Mark, did you come
12 aboard yet?

13 MEMBER GRIFFON: I did. I've been
14 listening in, Paul.

15 CHAIR ZIEMER: Okay.

16 MEMBER GRIFFON: I'm just catching
17 up here.

18 CHAIR ZIEMER: You figured out
19 we're on Issue 4?

20 MEMBER GRIFFON: Yes.

21 CHAIR ZIEMER: Okay. Any comments
22 on that?

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1 MEMBER GRIFFON: Not yet, no. No.

2 CHAIR ZIEMER: Okay. Very good.

3 MEMBER GRIFFON: Don covered mine,
4 I think. Thank you.

5 CHAIR ZIEMER: Yes, we're going to
6 keep this one open, then. NIOSH is going to
7 do a white paper to address the concern there.
8 Okay.

9 MEMBER POSTON: We haven't resolved
10 any of them yet.

11 DR. NETON: Half of Number 3.

12 MR. ALLEN: I tried to close 3.

13 CHAIR ZIEMER: Well, in abeyance is
14 -- in abeyance is making progress, right.
15 Okay. Number -- Issue Number 5, concerns with
16 method used to derive surface contamination
17 and associated external doses. This is a long
18 finding.

19 SC&A has several concerns with the
20 method used to derive the surface
21 contamination and associated external doses in
22 Table 6.4 of the TBD. I'm going to stop here

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1 for a minute. Do I need to read the whole
2 thing or --

3 DR. MAURO: Not for me.

4 CHAIR ZIEMER: I think all the
5 members have read it and have copies of it, so
6 basically the concerns are delineated here and
7 a suggestion on what the TBD should consider,
8 empirical data regarding surface
9 contamination. So NIOSH response?

10 MR. ALLEN: Well, like you said,
11 that's a long one. There's actually a couple
12 different issues in there.

13 CHAIR ZIEMER: Right.

14 MR. ALLEN: Essentially it amounts
15 to a disagreement on how we determine surface
16 contamination and what we use that for. One
17 issue is that it's not just deposition.
18 There's large flakes that are created during
19 production, especially hot work on uranium
20 that can be on the floor.

21 From everything we've seen, those
22 tend to get ground up fairly quickly under

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1 foot traffic, fork truck traffic, et cetera,
2 and become re-suspendable, and those are part
3 of the airborne that's in the plant once they
4 become re-suspendable.

5 It's been our contention all along
6 that the re-suspendable surface contamination
7 is linked to the airborne whether that is --
8 whether that's purely settling out, or whether
9 that's large flakes that are ground up and
10 become part of the airborne through re-
11 suspension, there's a connection between the
12 two.

13 The very idea of using a re-
14 suspension factor also says that. That re-
15 suspension factor is just a factor that you
16 multiply the surface contamination by to
17 arrive at how much airborne would be in the
18 air from that surface contamination.

19 Between that, removal rates,
20 there's quite a bit of literature that
21 basically says, you know, at least as an
22 approximation you can connect those two, and

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1 it seems that the comment pretty much is --
2 I'm not sure if this comment is you don't
3 believe you can connect the two, or if you
4 believe the way we connected the two is not
5 accurate.

6 DR. MAURO: Let me -- let me try to
7 capture it. The fundamental problem is the
8 idea that you start off with -- I mean,
9 there's some history here.

10 There was a time when the strategy
11 that NIOSH adopted was, listen, we have some
12 idea of what the airborne dust loading is of
13 these 5 micron particles, and we're going to
14 use that for inhalation. Okay, and we also
15 are going to operate from the premise that,
16 okay, it is that very same airborne dust
17 loading, with these 5 micron AMAD particles
18 that is going to be chronically in the air and
19 is chronically settling, and we know what the
20 settling velocity is.

21 And so, in theory, one could argue,
22 well, we could figure out, make some

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1 assumption how long is that settling going to
2 go on. Is it going to go on for a week, a
3 day, a year, and assume some buildup on the
4 surface, and that's the way in which the
5 buildup levels on surfaces were derived.

6 Now if you go back to the history,
7 you'll find that different time periods are
8 assumed. I think in this one you assumed --
9 in this particular place, you assumed that
10 buildup took place for seven days, but you
11 assumed it was 100 MAC, so in other words,
12 that's the strategy that was done here.

13 In other settings, different
14 approaches were used, but the idea that your
15 starting point is the sum concentration in the
16 air, and then you multiply by a deposition
17 velocity that's occurring for some time
18 period, is a recurring approach. The actual
19 time periods, the actual starting
20 concentrations in the air differ, we've seen,
21 in different settings.

22 Now we found that -- well, first of

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1 all, that basic understanding, we don't agree
2 with. We think that what's on the ground is
3 what's important, and to say that it got there
4 based on some deposition velocity from the
5 airborne particles is not the way to get to
6 what's on the surface.

7 We believe, especially in TBD 6000,
8 there is lots and lots of literature out
9 there. What is on the ground? How much --
10 how many, you know, Becquerels per meter
11 squared has accumulated on surfaces in these
12 old AWE facilities? The data are out there.

13 In fact, there's a great piece of
14 work done, again, in Adley, which B- where
15 they put plates out all over the plant, and
16 they allowed the airborne radioactivity to
17 accumulate on it. However they got there,
18 they don't care.

19 They put the plate out on the
20 ground, sitting there. It could have come
21 from settling. It could have come from chunks
22 falling off. They had it all over. They had

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1 several of them. I think they had about 15 of
2 them.

3 And at the end of 100 days, they
4 said, how much has fallen? And they came up
5 with a deposition rate, okay? They said,
6 empirically, we have some good information on
7 the number of grams per second per meter
8 squared that's coming down and depositing on
9 surfaces.

10 Now when we looked at that data, we
11 said, okay, here's some real empirical data
12 under a pretty messy site, old site, doing all
13 the kinds of things that they do at AWE
14 facilities.

15 That was the purpose of TBD 6000,
16 and we found that the default value you ended
17 up with, in terms of Becquerels per meter
18 square, that the number you picked based on
19 your model, would accumulate under the Adley
20 approach in three days.

21 In other words, given the Adley
22 rate, in three days, you would get to the

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1 point where you have the numbers here. So
2 it's almost like, quite frankly, I mean, I
3 have a concern about this deposition for the
4 .0075 thing, but you know, that's like a
5 philosophical problem. I say, let's put that
6 aside for a minute.

7 What you did is you took that
8 deposition rate, you assumed 100 MAC, which is
9 an enormous number, you allowed the stuff to
10 settle for seven days, and you got a number on
11 the surface. Let's take -- you know, all I
12 really care about is what's the number you got
13 on the surface, and does it make sense in
14 light of empirical data that's out there?

15 And my answer is, well, it doesn't
16 hold up very well when you compare it to the
17 empirical data that's out there from the Adley
18 report, because all it took was three days of
19 such deposition occurring in the Hanford melt
20 facility, and you would have achieved to reach
21 that, and so I say that you are not being
22 claimant favorable.

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1 CHAIR ZIEMER: Was that three days,
2 and then it's equilibrium?

3 DR. MAURO: And then they stop it
4 there, right. In three days -- in other
5 words, if that -- in other words, if you start
6 it up, three days later at the Hanford metal
7 melt facility, you would have the Becquerels
8 per meter squared that's your default value
9 used in TBD 6000.

10 CHAIR ZIEMER: Okay, but what was
11 the 100-day business?

12 DR. MAURO: No. Oh, the 100-day is
13 the -- wait. All I was saying is that when
14 you go back historically to -- I'm sorry. The
15 100-day period was a time period, I believe,
16 that they left their plates out. There was --
17 all they did in --

18 CHAIR ZIEMER: Okay, but were they
19 -- were they checking them every --

20 DR. MAURO: No, they just allowed
21 them to accumulate. They got the total
22 amount, integrated amount accumulated at the

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1 end of that time period.

2 DR. ANIGSTEIN: John, can I?

3 DR. MAURO: Sure.

4 DR. ANIGSTEIN: What you're saying
5 is that the TBD 6000 default value was three
6 percent of the Adley data.

7 DR. MAURO: No. No. What I'm
8 saying is the --

9 DR. ANIGSTEIN: Well, you said
10 three days. You said --

11 DR. MAURO: Yes.

12 DR. ANIGSTEIN: How did you get
13 your three days? I'm confused.

14 DR. MAURO: I'm not making myself
15 clear. Again, picture the Adley facility --

16 DR. ANIGSTEIN: Okay.

17 DR. MAURO: -- where they have all
18 these plates sitting around.

19 DR. ANIGSTEIN: Right.

20 DR. MAURO: And there were
21 different places, some places where there was
22 a lot of airborne dust, a lot of activity, and

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1 other places where there was very little.

2 DR. ANIGSTEIN: Right.

3 DR. MAURO: So there's a nice
4 table. I might have even put it in my report,
5 and they let them sit there, and I believe it
6 was for about 100 days. It was a protracted
7 period of time.

8 DR. ANIGSTEIN: Okay, but those
9 don't get re-suspended.

10 DR. MAURO: No, no. Those are just
11 sitting there. Whatever is happening there is
12 happening there.

13 DR. ANIGSTEIN: Right.

14 DR. MAURO: And at the end of that
15 time period, they grabbed the plate, and they
16 analyzed, okay, what's on the plate?

17 DR. ANIGSTEIN: Right.

18 DR. MAURO: And they got number of
19 Becquerels per meter squared, and that's the
20 amount that accumulated by that, after that
21 time period. So now we have Becquerels per
22 meter squared. That's real. That's what

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1 they're seeing.

2 Now I compared that Becquerel, and
3 now, they didn't -- and what they did with
4 that, they said, okay, what does this mean in
5 terms of the rate in Becquerels per second per
6 meter squared that's coming down?

7 In other words, so they were not so
8 much interested in what they saw at the end of
9 that time period, because you could have
10 picked any time period. What they were really
11 interested in, what rate of deposition during
12 operation would have to have occurred to
13 result in this much activity on the surface at
14 the end of 100 days?

15 DR. ANIGSTEIN: Okay. Did they
16 assume --?

17 DR. MAURO: So it was a --

18 DR. ANIGSTEIN: Did they assume
19 constant? Did they --

20 DR. MAURO: They averaged it.

21 CHAIR ZIEMER: You'd have to have
22 an average.

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1 DR. MAURO: They averaged.

2 DR. ANIGSTEIN: No, no, but I mean,
3 did they assume constant?

4 DR. MAURO: No.

5 DR. ANIGSTEIN: For 100 days?

6 DR. MAURO: They just said that, at
7 the end of 100 days --

8 DR. ANIGSTEIN: I know. So did
9 they -- how did they get a rate?

10 CHAIR ZIEMER: You'll have to get a
11 -- you have to assume it's constant to get a
12 rate.

13 DR. ANIGSTEIN: How did they get a
14 rate?

15 DR. MAURO: They said, it
16 effectively means that the rate is these many
17 Becquerels per second per meter squared.

18 DR. ANIGSTEIN: That's assuming
19 that it's constant --

20 DR. MAURO: Assuming that it's
21 constant, right.

22 DR. ANIGSTEIN: -- for 100 days.

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1 DR. MAURO: The reality is it's not
2 probably constant.

3 CHAIR ZIEMER: No, but they
4 averaged it out.

5 DR. ANIGSTEIN: But I'm saying --

6 DR. MAURO: Yes.

7 DR. ANIGSTEIN: But I'm saying, it
8 wasn't like some exponential factor where it
9 gets re-suspended again from those plates.

10 DR. MAURO: No, they didn't do
11 that. They --

12 DR. ANIGSTEIN: So it's linear.

13 DR. MAURO: It's linear. It's pure
14 linear, right?

15 DR. ANIGSTEIN: Okay, fine.

16 DR. MAURO: It's a very simple
17 model.

18 DR. ANIGSTEIN: So then you do mean
19 that it's -- when you say three days' worth,
20 you do mean three percent.

21 DR. MAURO: So --

22 CHAIR ZIEMER: The surface

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1 contamination elsewhere, where it's re-
2 suspended, has got to be about three percent
3 of the --

4 DR. MAURO: Well, no. No. All I'm
5 saying -- don't let's talk about re-suspension
6 right now.

7 CHAIR ZIEMER: Oh, okay.

8 DR. MAURO: Let's just simply say
9 that, when you look at the Adley data, you
10 find out what the rate of deposition is.
11 That's basically all it gives you. How many
12 Becquerels per meter squared per second is the
13 average rate at which uranium is falling out
14 onto surfaces.

15 CHAIR ZIEMER: No, I follow that.
16 My question is, how did they get the three
17 days to equilibrium where re-suspension is
18 occurring?

19 DR. MAURO: They didn't --

20 DR. ANIGSTEIN: I think you mean
21 three percent of what's on there.

22 DR. MAURO: No. Well, maybe that's

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1 what -- all I'm saying is that --

2 CHAIR ZIEMER: Well, if they said
3 it reached equilibrium after three days --

4 DR. MAURO: No, no. You're -- the
5 number they have that they are using as a
6 default value is the amount that would have
7 accumulated at the Adley plant in three days.

8 In other words --

9 CHAIR ZIEMER: Oh, I thought you
10 were saying that the Adley report was claiming
11 that they reached equilibrium in three days.

12 DR. MAURO: No.

13 CHAIR ZIEMER: No.

14 DR. MAURO: No, they did not, no.
15 The Adley report, they just put it out -- for
16 all intents and purposes, they would have left
17 it out there longer, and then they would have
18 more activity, and longer. They would have
19 more. They stopped at a certain --

20 CHAIR ZIEMER: No, I'm not talking
21 about equilibrium on these collection plates.

22 I'm talking about the work area where it's

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1 re-suspending.

2 DR. MAURO: Right. They didn't
3 make a distinction between B- all they did was
4 put plates out, and all I'm really saying is,
5 well, in effect, what the Adley report shows
6 us is that the numbers -- that there is a
7 certain rate at which uranium deposits out in
8 Becquerels per meter squared per second, per
9 day, whatever you --

10 CHAIR ZIEMER: And therefore, this
11 is the air concentration you would need.

12 DR. MAURO: Well not so much the
13 air, but this is the rate in the working
14 environment. Now, it depended on where you
15 were in the building.

16 CHAIR ZIEMER: Right.

17 DR. MAURO: I mean, there are a lot
18 of different places in the building.

19 DR. NETON: It would depend on air
20 concentration, right?

21 DR. MAURO: Yes, there's a rate at
22 which it's coming down. This is the number of

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1 Becquerels. Now how it got there, they didn't
2 discuss that. They said, this is what's on
3 the plate at the end of this time period.

4 CHAIR ZIEMER: Well, it's probably
5 linked to the air concentration.

6 DR. MAURO: No, no. It could have
7 been guys walking around kicking stuff, re-
8 suspending it.

9 CHAIR ZIEMER: That's right. That
10 is air concentration.

11 DR. MAURO: But it's not -- you
12 know, it could have been the original stuff
13 that was produced while you were grinding, or
14 it could have been stuff that was on the
15 ground and kicked up again.

16 DR. NETON: But the higher the air
17 concentration, the higher this number,
18 Becquerels per meter squared per second.

19 DR. MAURO: Yes. Yes, but the
20 number --

21 DR. NETON: Directly related to --

22 DR. MAURO: But the important point

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1 is this, and here's the question you have to
2 ask yourself. The number that you ended up
3 with in your report is a certain number of
4 Becquerels per meter squared as being, this is
5 the equilibrium value we're going to use for
6 the purpose of doing external exposure
7 associated with deposited activity, and also
8 re-suspension, which we'll talk about
9 separately. This is your starting point.
10 Here's what's on the ground.

11 Now what I'm saying is, if you were
12 at the Adley plant, and you started up
13 operation, and you started this activity, in
14 three days of operation, that's the amount of
15 radioactivity you'd have on the ground, the
16 amount that you folks have selected. Okay.

17 In other words, if you allowed that
18 operation to go for another, let's say, for
19 100 days, you would have 30 times more. In
20 other words, so what I'm saying is it's not
21 claimant favorable.

22 Three days of accumulation is the

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1 number you would get if you accept the Adley
2 data as being a reasonable way to predict the
3 rate at which uranium deposits on surfaces,
4 and if you accept that as being a reasonable
5 characterization of the rate at which uranium
6 deposited on surfaces in uranium metal
7 handling facilities, then the implication
8 being that your default value of Becquerels
9 per meter squared would have occurred, would
10 accumulate in three days.

11 That's all it takes, three days'
12 worth of operation, and that's how much you
13 would have accumulated. That doesn't seem to
14 be claimant favorable. Is that clear? I
15 mean, did I make it --

16 CHAIR ZIEMER: I think I know what
17 you're saying, but it's not obvious to me,
18 because when you're putting the plates out,
19 you're not measuring surface contamination.

20 DR. MAURO: Sure you are.

21 CHAIR ZIEMER: No you aren't.
22 Surface contamination is what's there. If I

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1 go -- if I understand it --

2 DR. MAURO: Yes.

3 CHAIR ZIEMER: -- on a working
4 surface, you've got stuff airborne, so the
5 surface contamination in a work area has got
6 to be lower, because a lot of it's up in the
7 air, than a static plate laying -- that's been
8 sitting there.

9 DR. MAURO: No, the plate was put
10 where people were working. In other words,
11 there was a guy -- in other words, they were
12 all over the place.

13 CHAIR ZIEMER: Yes, but --

14 DR. MAURO: They put them down, and
15 that's what so --

16 CHAIR ZIEMER: But the activity on
17 that plate is not being disturbed like the
18 activity on the work surface. That's what I'm
19 --

20 DR. MAURO: That's true.

21 CHAIR ZIEMER: It's not subject to
22 the re-suspension.

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1 DR. MAURO: That's true.

2 CHAIR ZIEMER: So in my mind, and I
3 don't know what the number is, but say it's
4 three days, say it's 50 days --

5 DR. MAURO: Okay.

6 CHAIR ZIEMER: -- in the working
7 area, the activity which is not airborne or
8 not re-suspended is -- if I took a smear and
9 got activity per unit area, I get a number
10 which I think is going to be different than a
11 tray or whatever it is that's sitting here,
12 not subject to re-suspension, that's just been
13 letting things settle down on it undisturbed
14 for whatever, whether it's three days or 50,
15 and that's why I was --

16 DR. MAURO: All right.

17 CHAIR ZIEMER: -- getting at the --
18 I think, Bob, you were thinking along that
19 line is --

20 DR. MAURO: Okay.

21 CHAIR ZIEMER: -- in other words,
22 is the surface contamination, and I don't

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1 think we know that, for example, 30 times less
2 at a given time than activity in the tray, or
3 half as much or whatever.

4 DR. MAURO: Fair enough. Fair
5 enough.

6 CHAIR ZIEMER: So I'm trying to
7 think about --

8 DR. MAURO: Fair enough. Fair
9 enough. The exact analogy is not there.
10 You're saying that, because they're a plate,
11 by definition, they're not going to be
12 impacted in the same way that a true surface
13 is where there are people walking around that
14 could cause --

15 CHAIR ZIEMER: Right. In fact, if
16 the people weren't walking around, that thing
17 is going to -- itself can be equilibrium, or
18 is going to --

19 DR. MAURO: No, no, no. It's
20 accumulating for -- everything is --

21 CHAIR ZIEMER: No, no, I mean, as
22 long as there's airborne contamination and

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1 there's processes going on and people stirring
2 things up, but if you just went in and
3 operated three days and stopped --

4 DR. MAURO: Yes.

5 CHAIR ZIEMER: That would be very
6 different, but here you're going to continue
7 to play it out on that. I don't know. Let
8 the others think about this. John, what do
9 you think about the --

10 MEMBER POSTON: Well, I was about
11 to ask if you know details about the plate,
12 because, you know, a lot of places use fallout
13 trays that have sticky surfaces. There was no
14 way it could reach the --

15 DR. MAURO: Yes, in fact, we
16 described the plate dimensions and how they
17 used it, and it was totally done for the
18 purpose of seeing how much stuff is falling,
19 the rate at which material is coming down. It
20 wasn't --

21 CHAIR ZIEMER: Now, you might get
22 some re-suspension from air currents, I grant

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1 you that, but the bit stuff is not going to be
2 ground up and --

3 DR. MAURO: You're right. So in
4 other words, what you're saying is it might be
5 biased high. It might be biased high.

6 CHAIR ZIEMER: I don't know.

7 DR. MAURO: The plates might be
8 biased high, because what happens is its --

9 CHAIR ZIEMER: The heavy stuff will
10 stay put.

11 DR. MAURO: It's accumulating
12 stuff, because things are being re-suspended.

13 CHAIR ZIEMER: Right.

14 DR. MAURO: But it's not losing
15 stuff, because things are --

16 CHAIR ZIEMER: The heavy stuff's
17 not getting ground up.

18 DR. MAURO: So I would agree that
19 that would be a -- the plates may very well be
20 biased high, and I guess the best way to look
21 at it is to the extent that we looked into
22 this matter, I again drew upon measured

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1 information, and there's a lot more to the
2 story than this that's in the main body of the
3 report.

4 There's -- for example, at Simonds
5 Saw, they hung film badges. It's not in this
6 part, but it's another part of the story, and
7 there was a certain radiation field that they
8 measured, and say, okay, if you assume that
9 radiation field that you're measuring from
10 these film badges that are hanging is due to
11 radiation generated from surface contamination
12 --

13 CHAIR ZIEMER: Right.

14 DR. MAURO: Right, now I could -- I
15 back-calculated it. I think, Bob, you may
16 have run the calculation. What -- how much
17 Becquerels per meter squared would have to be
18 of natural uranium on surfaces like an
19 infinite plane --

20 CHAIR ZIEMER: Right. Right.

21 DR. MAURO: -- with the badges held
22 about --

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1 CHAIR ZIEMER: No, I'm okay.

2 DR. MAURO: And it turns out the
3 amount of activity would have to be 100 times
4 higher. So in other words, so now I'd be the
5 first to admit that the radiation readings
6 experienced by these film badges may very well
7 be due to a lot of things. It could be due
8 from what's on surfaces. It could be to what
9 deposited on them directly, and it could be to
10 the steel bars.

11 CHAIR ZIEMER: Yes.

12 DR. MAURO: And so I didn't really
13 go -- I mean, I mentioned that, but it's
14 interesting, though. But it's interesting
15 that it was a 100-fold difference, and when I
16 did the plate effect, it's a 100-fold
17 difference, so in other words --

18 CHAIR ZIEMER: That sounds a little
19 coincidental to me.

20 DR. MAURO: It's kind of a
21 coincidence, but when you get a coincidence, I
22 say, well, something isn't right here. The

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1 numbers are too low. I mean, that's how I walk
2 away from this.

3 DR. NETON: These badges are
4 hanging vertical, right?

5 DR. MAURO: Yes.

6 DR. NETON: They're measuring the
7 --

8 DR. MAURO: They're measuring the
9 radius.

10 DR. NETON: -- from quite a
11 distance.

12 DR. MAURO: Yes.

13 CHAIR ZIEMER: I want to get a
14 little NIOSH response here, too. And I don't
15 know where we are on this except that John's
16 raised the question that I think about whether
17 or not your approach, or whether the link
18 between -- it has to do with the link between
19 surface contamination and the airborne
20 activity, I guess, is what we're telling you.

21 DR. MAURO: Well, I don't even --

22 CHAIR ZIEMER: Are there two parts

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1 to it?

2 DR. MAURO: I think there's no
3 doubt that that model is unsound. In other
4 words, I'm not pulling my punches on that one.

5 CHAIR ZIEMER: Which model?

6 DR. MAURO: Whereas, the idea that
7 the way you calculate what's on surfaces is by
8 measuring the airborne radioactivity, okay,
9 that's in there, and then assuming a
10 deposition rate of 0.00075 meters per second,
11 and then allow that deposition to take place
12 for some time period. I do not think that's
13 scientifically valid. In other words, if you
14 want to know what's on the ground, you do not
15 use that method, because embedded in that
16 assumption is that the only thing that's
17 floating around in the air are 0.5 micron
18 AMAD, and I do not think that that's a valid
19 way to approach that model.

20 You know, when you have real --
21 especially in this particular TBD, when you
22 have real measurements of what's on surfaces,

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1 where you have real measurements of the rate
2 at which material is falling down onto
3 surfaces, you don't use this extremely
4 indirect method where you simply assume that
5 the stuff that's -- the only stuff that's on
6 surfaces got there because it was -- it
7 settled out at a velocity of 0.00075 meters
8 per second, and that very value was selected
9 because it's based on 0.5 micron AMAD, and
10 then you make some assumption about how long
11 that goes on.

12 I've seen in some places you assume
13 it goes on for a week, and then you stop.
14 I've seen other places where you assume it
15 goes on for a year, and then stopped, and so
16 there are certain inconsistencies on how it's
17 being applied in different places, but in my
18 mind, the whole approach is fundamentally
19 flawed.

20 I think the right way to go,
21 especially in this case, is to go to Adley,
22 and Adley did the best job they could. That's

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1 why they did it. They said, listen, we've got
2 a uranium handling facility, and it's a big
3 complex facility. Every different room is
4 doing something a little bit different.

5 Let's put these plates out, these
6 flat plates out, and see the rate at which
7 uranium is accumulating on these plates in
8 these different locations, and that's what you
9 should be using as your rate of buildup.

10 And then all I did was I looked at
11 the rate of buildup as determined in the
12 various areas, and I found that that rate of
13 buildup is such that, you know, the amount of
14 activity that you ended up picking as your
15 default activity from the model you used would
16 build up in only three days' worth of
17 operations at the Adley plant, and I think
18 that's a problem. See, and that's --

19 CHAIR ZIEMER: Okay, yes, so --
20 yes, so there's a big difference there. Now,
21 I'm trying to envision, though, it's still a
22 way to link to air concentration, is what

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1 you're after.

2 DR. MAURO: You could. Yes, you
3 could. In fact --

4 CHAIR ZIEMER: I mean, what are you
5 going to do with the number?

6 DR. MAURO: Well, yes.

7 CHAIR ZIEMER: If you use the
8 Adley.

9 DR. MAURO: No, with the Adley
10 number, all I'm saying is I know my rate at
11 which it's coming down.

12 CHAIR ZIEMER: Right.

13 DR. MAURO: And I'm saying that,
14 well, let's make some assumption of how long
15 is that going to continue --

16 CHAIR ZIEMER: Right.

17 DR. MAURO: -- before you clean it
18 up, before there's some housekeeping, before
19 you reach some kind of equilibrium?

20 CHAIR ZIEMER: Yes.

21 DR. MAURO: I don't know the answer
22 to that, but it's certainly not three days.

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1 DR. NETON: That's totally
2 independent of any air concentrations that
3 were generated.

4 DR. MAURO: Say that again.

5 CHIEF ZIEMER: No.

6 DR. MAURO: No, it is. No, you
7 could --

8 DR. NETON: That number is totally
9 independent, because you don't know what the
10 air concentration is.

11 DR. MAURO: We don't know what the
12 -- that's right.

13 DR. NETON: You're just assuming
14 that --

15 DR. MAURO: Right.

16 DR. NETON: -- the Adley process is
17 representative of all AWEs.

18 DR. MAURO: I'm saying that --

19 DR. NETON: That's what you're
20 saying.

21 DR. MAURO: Right, and -- well, no.

22 DR. NETON: I don't think I agree.

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1 DR. MAURO: No, no, no, no, no, I
2 didn't say that. I said to myself, when I see
3 an analysis like the one you performed, I say,
4 how do I come at this problem from another
5 direction to convince myself it's reasonable?
6 And I did that, and I did that with the Adley
7 work, because you folks didn't use the Adley
8 work. I said, let me come at it from that
9 direction, and let me also come at it from the
10 Simonds Saw direction, where they had the film
11 badge tie-in.

12 So I said to myself, if all of this
13 rings true, that is, when I'm done looking at
14 the Adley data and looking at the Simonds Saw
15 film badge data, if I see that the activity on
16 surfaces that you folks ended up with, not
17 withstanding how you got to it -- you know, I
18 don't care about how you got to it.

19 You come up with a -- you end up
20 with a number on the ground. Does that number
21 on the surface seem to be reasonable when I
22 test it against information from other

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1 sources, Simonds Saw and Adley, and I say, no,
2 it doesn't. Simonds Saw, it's low by a factor
3 of 100. Adley, it could easily be low by a
4 factor of 10.

5 DR. NETON: Have you got something
6 to say?

7 MR. ALLEN: Yes, I mean, just to
8 make sure we're clear on this, Adley has no
9 contamination levels listed in it. It's a --

10 DR. MAURO: No, they do.

11 MR. ALLEN: -- it's a deposition
12 rate.

13 DR. MAURO: They do have the
14 amounts, and they tell you, but they give you
15 the rate, because they were more interested in
16 the rate, because they could have left those
17 plates out shorter or longer, so that was
18 almost like arbitrary. They just left them
19 out for some time period so that they --
20 you've got the idea.

21 MR. ALLEN: They did it in the
22 winter months, and then they did it in the

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1 summer months.

2 DR. MAURO: They did it in the
3 winter and the summer, too, to see how
4 different it was.

5 MR. ALLEN: And it was, I think,
6 like 150 days versus 117.

7 DR. MAURO: Exactly.

8 MR. ALLEN: It was arbitrary.

9 DR. MAURO: It was arbitrary.

10 MR. ALLEN: And from that they
11 divided by --

12 DR. MAURO: Time.

13 MR. ALLEN: -- the days, and they
14 got a -- I think it was micrograms per square
15 foot per day.

16 DR. MAURO: That's the -- that's
17 the correct units.

18 MR. ALLEN: And, as we mentioned,
19 it's not really susceptible to re-suspension
20 or as much re-suspension as the work areas
21 would get, but it gives you a deposition rate.

22 DR. MAURO: Right.

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1 MR. ALLEN: And then the question
2 is, with re-suspension, do we expect some sort
3 of buildup to a contamination level, and the
4 real argument here is, how much time do you
5 put on whatever deposition rate that you come
6 up with? How much time do you put on it to
7 get that buildup equilibrium low? And it
8 seems to be that almost anything you do, it's
9 a factor.

10 DR. MAURO: Well, you had to do
11 that, too.

12 MR. ALLEN: And we do that, too.

13 DR. MAURO: You did seven days, and
14 you saw --

15 MR. ALLEN: It's the same thing.
16 It's just essentially taking airborne
17 concentrations, because that's what you did to
18 get that rate.

19 DR. MAURO: No, you see, you
20 started with 100 MAC as your airborne, and
21 that's some default upper bound. I agree with
22 you.

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1 You picked 100 MAC as your default
2 upper bound value from looking at a lot of
3 data, and I'm not going to argue with that. I
4 think 100 MAC is a very high value for
5 airborne. Then you applied that deposition
6 rate, and you let that go on for seven days,
7 and you came up with a number.

8 Now, you know, to me, that's a
9 fairly arbitrary. There's aspects to it that
10 I think are conservative. I think the 100 MAC
11 is very conservative as what you start -- as
12 your starting point for what's in the air.

13 Then I say, but hold the presses.
14 I don't buy the mechanistic thing that you
15 used that is -- in other words, that the way
16 in which that activity on the surface gets
17 there at a real plant is because you're
18 getting 5-micron AMAD particles coming down.

19 You end up with some activity on
20 the surface. There is no doubt you end up
21 with that.

22 MR. ALLEN: Right.

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1 DR. MAURO: But the -- now, the
2 method by which you got there, I don't agree
3 with. I don't think that mechanistically
4 exists in reality. That's not the way the
5 real world works. That's not the way in which
6 the AWE surfaces get contaminated, but I said
7 to myself, I don't really care about the
8 mechanism you use.

9 I really care about the amount of
10 activity you ended up with on surfaces and
11 that the amount of activity you ended up on
12 surfaces is not compatible with the
13 information I reviewed from other sources.

14 MR. ALLEN: So, what it comes down
15 to is you don't agree with the mechanism that
16 we used, but it --

17 DR. MAURO: More importantly --

18 MR. ALLEN: -- would be acceptable
19 if you would agree with the time frame we
20 applied.

21 DR. MAURO: It would be irrelevant
22 if it turns out that --

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1 MR. ALLEN: It would be irrelevant.

2 DR. MAURO: -- mechanism ended up
3 with a concentration on surfaces which is
4 compatible and consistent what you see at
5 Adley and at Simonds Saw, because we know
6 those three bounding surfaces.

7 CHAIR ZIEMER: Do we have any --
8 did they analyze what was in the trays in
9 terms of particle size distributions?

10 DR. MAURO: No, I don't think so.

11 CHAIR ZIEMER: One thing you're
12 going to get on those trays, you're going to
13 get some big stuff that's not respirable --

14 DR. MAURO: That's true.

15 CHAIR ZIEMER: -- and therefore
16 could not contribute to internal dose.

17 DR. MAURO: Well, that's true.
18 That's true.

19 DR. NETON: Yes.

20 CHAIR ZIEMER: And if --

21 MEMBER BEACH: But if it was on the

22 --

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1 CHAIR ZIEMER: But would contribute
2 to a significant fraction of what's in the
3 trays activity-wise, because it would be large
4 masses.

5 MEMBER BEACH: Yes, because what
6 was falling in a work surface, it could be re-
7 suspendable by the crushing and the work
8 activity.

9 DR. MAURO: There is a counter-
10 argument I see. The very argument used before
11 --

12 MEMBER BEACH: But use the idea.

13 DR. MAURO: -- that, wait a minute,
14 no one is walking on this stuff, and therefore
15 it's not re-suspending, but if someone were
16 walking on it and there was anthromorphing,
17 you may write that stuff down to a point.

18 CHAIR ZIEMER: Right. Right.

19 DR. MAURO: Now, all of a sudden,
20 there is re-suspendable, and it is inhalable.

21 CHAIR ZIEMER: Right.

22 DR. MAURO: So, I mean --

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1 CHAIR ZIEMER: But that's where you
2 want to take into consideration some MAC
3 level, I guess, and say, you know, what could
4 the -- what could the airborne concentration
5 be under these conditions where you're
6 chopping this stuff up? Yes, I think it's a
7 puzzle, because --

8 DR. MAURO: I think that --

9 CHAIR ZIEMER: -- there's some
10 things about the trays, the collection trays
11 that cause some problems in terms of relating
12 it back to respirable particles, so --

13 DR. MAURO: No, we're not there
14 yet.

15 CHAIR ZIEMER: No.

16 DR. MAURO: All I'm saying is I
17 don't want to talk about the re-suspension
18 factor pathway. All I want to talk about is
19 you folks have come up with an amount of
20 Becquerels per meter square that you're going
21 to use as a default value. Let's forget about
22 how you got there.

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1 Here's my -- let's say you decide
2 this is the number we're going to use. You
3 didn't even tell us what you did. Let's make
4 believe that happened.

5 Here's the number we're going to
6 use. These may be Becquerels per meter
7 squared, and we think that's a good number.
8 Then you come over to SC&A and say, SC&A, what
9 do you -- do you think that's a good number?
10 Well, let me check it out.

11 I go ahead, and I look into the
12 literature that I know of, Simonds Saw and
13 Adley, and I say, no, I don't think that's a
14 good number. I think it's too low, maybe too
15 low by a factor of 10, maybe even as much as a
16 factor of 100, and I give you my reasons.

17 I didn't even know how you got that
18 number. You just gave me a number. Now,
19 that's all I'm saying, now, and for the
20 reasons I gave.

21 Now, you could come back, counter-
22 argument, wait a minute. Wait a minute. The

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1 literature you used, let's first go to the
2 Adley numbers, and that was based on these
3 plates, right? You say, yes, that's right,
4 and those plates were not subject to re-
5 suspension, so, therefore, they may be biased
6 high. I agree, but I consider that to be a
7 second-order process. I don't think that's
8 major. In other words, the
9 amount you're going to lose from it just so
10 happens that some of it is going to be re-
11 suspended, you know, I don't give too much
12 importance to that. I would say that I'm
13 looking for a bounding estimate.

14 I'm looking for a plausible upper
15 bound, and I would say that, well, granted,
16 that might be somewhat biased high. You know,
17 we probably could do some quantitative
18 analysis on how much might be lost, in other
19 words, if there was re-suspension going on,
20 and figure out how much might have been lost
21 from that plate using some high re-suspension
22 factor, you know, and how much would it

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1 change?

2 We could do a sensitivity analysis
3 on that, and I suspect that we're going to
4 find that it's really relatively insensitive,
5 but I don't want to jump the gun, you know,
6 but it's tractable, which --

7 MR. THURBER: John, this is Bill
8 Thurber.

9 DR. MAURO: Yes?

10 MR. THURBER: The point -- this
11 specific comment was made in the context of
12 external exposure.

13 DR. MAURO: That's correct.

14 MR. THURBER: Not internal
15 exposure. I think that that kind of is
16 getting lost in what I hear in some of the
17 conversation.

18 DR. MAURO: Well, Bill, that's
19 both. You're right, because I am concerned
20 about this concentration for two reasons.

21 MR. THURBER: Well, I know it's
22 relevant to dose, but our comment was

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1 specifically as relates to external radiation,
2 where what you care about is the dust cloud
3 the guy is standing in and how much is on the
4 floor that he is getting exposure from.

5 DR. MAURO: Yes, but you notice the
6 comment is it's both external and internal,
7 so, I mean, you're right.

8 CHAIR ZIEMER: Yes, this particular
9 issue focuses on the external, but there are
10 some --

11 DR. MAURO: Yes, they're a follow-
12 on, but --

13 MR. THURBER: There are follow-on
14 ramifications, clearly.

15 DR. MAURO: Yes. I don't know. I
16 guess, to answer your question, Paul, yes, I
17 think that there are probably ways to place
18 some quantitative estimate. Yes, how much is
19 it biased high?

20 And it might be worth looking at,
21 but at this point in time, all I can
22 communicate is the concerns that -- what I did

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1 to raise the concerns that I have, and I think
2 that it would be worthwhile for NIOSH to take
3 a look at the Adley report and the deposition
4 plates, for better or worse, you know, because
5 this is what I brought to the table, and also
6 the Simonds Saw data, and see if it speaks to
7 you the way it spoke to me.

8 It spoke to me in a way that says,
9 hmm, I think the activity you guys ended up on
10 surfaces is somewhat too low, but not by a
11 little. Bob, I know you're my biggest critic,
12 so --

13 CHAIR ZIEMER: Well, no, I have --
14 let me ask one other thing, Bob, and then hear
15 from you. Now, the other part of that
16 external, you've got the dose from the
17 surfaces, and then I guess you've got a cloud
18 calculation, too, right?

19 DR. NETON: It is trivial, but yes.

20 CHAIR ZIEMER: And that part is
21 pretty trivial in most of these cases, so if
22 the --

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1 DR. NETON: The airborne --

2 CHAIR ZIEMER: Can we ignore the
3 cloud on this?

4 DR. NETON: Essentially, yes.

5 CHAIR ZIEMER: Okay. So the
6 difference in the deposition rates and in the
7 particle sizes is the main issue that is
8 affecting, because the trays -- the trays will
9 take care of the big particles.

10 You're saying they're going to get
11 ground up in the workplace a little more and
12 re-suspend. I mean, there would be more of
13 it. Well, I'm trying to -- I'm trying to get
14 a feel for how much of that is going to get
15 back up in the air versus --

16 DR. NETON: Yes, I don't know that
17 we're going to solve that issue today.

18 CHAIR ZIEMER: No, we can't solve
19 it today. I'm just trying to get a feel for
20 the --

21 DR. NETON: Yes.

22 CHAIR ZIEMER: You know, what --

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1 DR. NETON: It's been a while since
2 I've looked at the idling tray data. I mean,
3 I'm aware of it. I looked at it at one time
4 pretty extensively and didn't feel it was
5 worth much. Now, that was my opinion when I
6 looked at it. I have not looked at it maybe
7 from your perspective.

8 DR. MAURO: But you can -- Jim, but
9 you think that this model -- do you think
10 that's worse than this model? I mean, come
11 on.

12 DR. NETON: I don't know. I still
13 haven't gotten past the fact that this is a --
14 I don't know why this was not air
15 concentration dependent, the Adley model.

16 DR. MAURO: Well, there is no --

17 DR. NETON: Per square meter per
18 second is dependent upon the airborne
19 concentration.

20 DR. MAURO: Well, there is no doubt
21 you can go from the activity on the surface
22 that you know how to get there somehow. Now,

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1 we could theoretically say, okay, we know --
2 let's assume it came there from deposition,
3 okay. You could predict. You know, we'd know
4 what the deposition rate is. Well, knowing
5 the --

6 DR. NETON: Well, but, I mean,
7 normally these things are presumably out there
8 24/7.

9 DR. MAURO: Yes.

10 DR. NETON: During production, not
11 during production.

12 DR. ANIGSTEIN: There is a way
13 around a lot of those issues, and that is
14 using a very simple box model, and that simply
15 is you've got an equilibrium concentration on
16 the floor that means the deposition rate is
17 equal to the re-suspension, not the re-
18 suspension factor but re-suspension rate. So
19 once --

20 DR. MAURO: No, no, the removal
21 rate, because re-suspension goes up, it comes
22 back down again.

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1 DR. ANIGSTEIN: No, I'm just saying
2 the deposition rate is all -- everything that
3 falls from the air, regardless of how it got
4 there, and then there is a re-suspension rate
5 or a removal rate, as you wish, which is how
6 it goes down.

7 So, you know, in other words,
8 income equals out-go, and since we already
9 have a handle on one number -- we know the
10 deposition rate. We accept the deposition
11 rate from Adley.

12 All we need to come up with is some
13 plausible re-suspension rate, and, of course,
14 the lower the rate, the higher your
15 concentration is going to be, because your
16 surface concentration is simply the deposition
17 rate, which would be in, let's say, in grams
18 or Becquerels per second per square meter, and
19 the -- I'm going to call it re-suspension
20 rate, for lack of a better term, the removal
21 rate, which would be simply a fractional per
22 seconds.

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1 CHAIR ZIEMER: Yes, if you could
2 isolate those, but in the meantime you've got
3 source term inputs from processes, I think.

4 DR. ANIGSTEIN: But I'm talking --
5 when I say deposition rate, the Adley -- my
6 understanding from what John said of the Adley
7 data is it includes all --

8 CHAIR ZIEMER: I know.

9 DR. ANIGSTEIN: -- all source
10 terms.

11 CHAIR ZIEMER: I know.

12 DR. ANIGSTEIN: So you've got a
13 source -- I mean, the point is you've got --
14 the point is this can be -- one can be a blind
15 mathematician doing this. You know nothing
16 about what is going on there. All you know is
17 this is what's coming in.

18 This is a plausible fractional
19 removal rate now. Removal is fractional. So
20 much is removed per second, and then what is
21 the equilibrium concentration on the floor?
22 It's simply one divided by the other.

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1 DR. NETON: I've got a basic
2 problem with this Adley data. It represents
3 the deposition rate in a plant over a 100-day
4 period --

5 DR. MAURO: Yes.

6 DR. NETON: -- for that plant only.

7 DR. MAURO: And all the different
8 rooms in the plant.

9 DR. NETON: It's facility-specific.

10 DR. MAURO: Yes, absolutely.

11 DR. NETON: And it is totally
12 dependent upon the number of times those
13 machines ran or what frequency, if they ran it
14 for an hour and then shut it off for five
15 days, so you don't really --

16 DR. MAURO: And it covers two
17 orders of magnitude, depending on what room
18 they're in.

19 CHAIR ZIEMER: And ventilation
20 rates.

21 DR. NETON: No, but what I'm saying
22 is --

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1 DR. MAURO: It does everything.

2 DR. NETON: It's specific upon the
3 amount of work --

4 DR. MAURO: Right.

5 DR. NETON: -- and the types of
6 work and the time period you see of that work
7 in that plant, so this value is only valid for
8 this plant for that time period.

9 DR. MAURO: Good. Good. All
10 right, and if it turns out --

11 DR. NETON: It's still valid.

12 DR. MAURO: Okay, and if it turns
13 out that they did work, and you know that was
14 a good piece of work -- you look at it. You
15 convince yourself.

16 DR. NETON: Yes, I'm not -- I agree
17 with you.

18 DR. MAURO: Everybody convince
19 themselves, and it comes out that the activity
20 in this particular facility is ten times
21 higher than the number you're using for your
22 default value, by definition this can't be a

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1 good AWE, generic AWE, because I've already
2 found one that's ten times higher than yours.

3 You see what I'm trying to say?
4 I'm saying the purpose of TBD 6000 is to be
5 applicable to all facilities when you don't
6 have real data, and along comes one facility
7 that shows you're underestimating the activity
8 on surfaces by a factor of ten, at least.

9 MEMBER MUNN: This is Wanda. I
10 have to insert one thing here.

11 CHAIR ZIEMER: Yes.

12 MEMBER MUNN: It's very easy to
13 understand what transpired with respect to the
14 Adley data. What no one has mentioned -- I
15 don't even know if it's known -- is the rate
16 of housekeeping that took place in that
17 facility or in any other facility.

18 Most of the radioactive materials
19 production facilities had at least a modicum
20 and, in most cases, rather severe housekeeping
21 procedures that maintained surfaces relatively
22 clear from one day to the next of debris from

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1 preceding operations.

2 The same was true of flooring,
3 especially if you were talking about any kind
4 of materials that might be recovered so that
5 when you say you have good, firm figures over
6 what deposition rates were, all you're really
7 saying is you know what the deposition rates
8 were averaged over a period of 100 days or
9 whatever the number of days was.

10 DR. MAURO: Yes.

11 MEMBER MUNN: You cannot say
12 anything about the adjacent surfaces which
13 must have been cleaned. Even if only once a
14 week, that would give you a 14- or 15-time
15 house cleaning activity, which would have
16 removed, re-suspended or even removed direct
17 deposits throughout that period of time.

18 So, in order to say that you can
19 relate that figure directly to doses, you have
20 to have some knowledge of whether or not the
21 surfaces which were not collection surfaces,
22 the surfaces where people actually worked,

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1 were cleaned and at approximately what times.

2 In many cases, they were cleaned
3 daily, so this would lead you to the
4 conclusion that any figure that you had
5 accumulated from the plates would certainly be
6 claimant-favorable. They would not have taken
7 into account the cleaning of surfaces that
8 would have taken place in the plant itself.

9 DR. MAURO: Wanda, we completely
10 acknowledge and agree with that, and all we
11 can say is that our analysis using the data we
12 have says that your number would be good if it
13 turns out every three days they scrubbed that
14 place clean. Okay, that's a -- and if that's
15 -- if you find that to be claimant-favorable
16 and adequate for TBD 6000, that's fine. I
17 guess I don't.

18 I think that's a little bit too-
19 short time period, you know. Now, but if
20 there is evidence that across the complex that
21 that type of good housekeeping was in place,
22 then you're absolutely correct.

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1 The numbers you have are probably -
2 - the absolute numbers that you've come up
3 with as your default activity is just fine,
4 but I guess I've been operating on the premise
5 that three days is just a little bit too
6 short.

7 CHAIR ZIEMER: Well, even if it
8 wasn't, John, I think you're saying that the
9 number you're getting for surfaces is still
10 much higher.

11 DR. MAURO: Well, because I am
12 assuming that accumulation goes on for more
13 than three days now.

14 DR. NETON: For 100.

15 DR. MAURO: Perhaps as long as 100
16 days.

17 DR. ANIGSTEIN: But it doesn't even
18 have to be that it gets scrubbed clean every
19 three days. It simply is that the removal
20 rate through all mechanisms is one-third per
21 day, because that's exactly what the equation
22 will tell you.

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1 DR. MAURO: Bingo. Right.

2 DR. ANIGSTEIN: It's simply the
3 deposition rate divided by the removal.

4 DR. MAURO: You're right. That's
5 right. Now, is that a good -- is that a good
6 presumption for the purpose of building a
7 generic model for AWEs? I mean, that's what
8 it comes down to.

9 CHAIR ZIEMER: Let me see if Mark
10 has any comments. Mark, you've been listening
11 here. What words of wisdom do you have for us
12 on this?

13 MEMBER GRIFFON: Nothing yet, no
14 words of wisdom at all.

15 CHAIR ZIEMER: Okay.

16 MEMBER GRIFFON: I'm listening in.
17 I'm actually trying to find the correct
18 matrix and stuff, so I'm fumbling around with
19 documents, but --

20 CHAIR ZIEMER: The one we're
21 looking at, Mark, was sent out Monday of this
22 week.

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1 MEMBER GRIFFON: Oh, okay. I'm not
2 --

3 CHAIR ZIEMER: It has the -- it has
4 NIOSH response and SC&A's replies in it, so
5 it's very recent.

6 MEMBER GRIFFON: Okay. Okay.

7 MEMBER BEACH: So are we asking for
8 another white paper?

9 CHAIR ZIEMER: Well, I don't know
10 yet what we're asking for. Jim, what's your
11 thought on our next step here from your point
12 of view?

13 DR. NETON: Well, I think we're
14 headed that way. These are some fairly
15 complex issues that need to be worked out, and
16 we're not going to come to a consensus at this
17 table.

18 CHAIR ZIEMER: I think the main
19 thing here was to make sure the issues are on
20 the floor and we understand what we're talking
21 about.

22 DR. NETON: Yes, a very good

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1 understanding of where SC&A's position is.

2 DR. MAURO: That's all I could ask
3 for.

4 DR. NETON: No, and we need to go
5 back and re-look at the little plates or
6 whatever they used at Adley.

7 DR. MAURO: And don't forget the
8 Simonds Saw film badge.

9 DR. NETON: Yes, that's a little
10 more of a stretch, I think.

11 DR. MAURO: It is.

12 DR. NETON: The plates --

13 DR. MAURO: But when that --

14 DR. NETON: The plates have some
15 merit. The film badges I'm not sure how you
16 can model.

17 DR. MAURO: But when the two of
18 them came in in the same place, could it have
19 been coincidence? Maybe.

20 CHAIR ZIEMER: Well, so what we'll
21 do, I think, if it's agreeable is leave this
22 with -- NIOSH is going to take another look at

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1 the Adley paper and evaluate, and we'll have
2 to have further discussion on this.
3 Obviously, some interesting issues on both
4 sides of the plate, but there also is
5 downstream from this some implications on air
6 activity.

7 DR. MAURO: We are about to do that
8 right now.

9 CHAIR ZIEMER: Right, and --

10 DR. NETON: And I would point out
11 that these are not huge motions that we're
12 talking about here again.

13 CHAIR ZIEMER: Right.

14 DR. NETON: These are sort of
15 second order corrections, but nonetheless they
16 need to be done.

17 CHAIR ZIEMER: So this one is going
18 to stay open.

19 MR. ALLEN: Can we make sure -- I
20 mean, I think one key part of this, I didn't
21 understand exactly what the comment was, and I
22 think John can attest now that it's kind of a

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1 difficult thing to describe.

2 DR. MAURO: I think now we know
3 where it is. That's why this is important.
4 It's pretty simple.

5 MR. ALLEN: But if I understood
6 right, you don't disagree that it is possible
7 to, at least as a first order approximation,
8 to link the airborne with surface
9 contamination. The two are related.

10 DR. MAURO: But not the way you did
11 it.

12 MR. ALLEN: But not the way I did
13 it, but you're saying there is some factor --

14 CHIEF ZIEMER: Well, they've got to
15 be --

16 DR. MAURO: Somehow it's got to --

17 CHIEF ZIEMER: There's a place for
18 that, or it wouldn't work.

19 MR. ALLEN: Okay, so that's off the
20 table. There is agreement that there is some
21 sort of factor you could use with --

22 CHAIR ZIEMER: However it's done.

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1 DR. MAURO: I brought up this lack
2 of relationship simply because when you're
3 grinding uranium, if you want to consider a
4 flake popping off a grinding wheel and falling
5 off to the ground as being airborne, that's
6 fine. Then, yes, I'll say yes, it's
7 proportional, but when I think airborne, I'm
8 thinking about the general air as just sort of
9 like --

10 So, I've got to tell you, I have a
11 problem with saying -- because when they're
12 grinding, you know, I have this picture in my
13 mind of the sparks coming off a grinding
14 machine or whatever they're doing, and these
15 flakes or coming, or a roller, and these big
16 flakes are coming off and falling on the
17 ground.

18 I don't consider that to be
19 airborne activity. This is a flake coming
20 off, a visible flake. It falls on the ground.
21 You step on it. You grind on it. That
22 becomes part of what's on the ground.

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1 DR. ANIGSTEIN: And also, to
2 reinforce what you're saying, the comment that
3 everything that's falling on the ground will
4 be uniformly ground to a fine powder, that
5 depends where it falls.

6 DR. MAURO: Yes.

7 DR. ANIGSTEIN: If it happens to be
8 right where someone, a workman is standing at
9 a lathe and he's always moving back and forth
10 within a small area, perhaps, but there are
11 many -- I mean, foot traffic is not uniformly
12 distributed over the floor.

13 DR. MAURO: Right.

14 DR. ANIGSTEIN: There are places
15 where you don't walk, because they are behind
16 something. They're in the corner. They're
17 near the wall. They're underneath, so some
18 parts of it will get ground if there are
19 vehicles coming in. Again, they are on
20 wheels. There are tracks, and a lot of this
21 stuff will stay relatively undisturbed, not
22 moved around, but you cannot say that all the

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1 big chunks --

2 DR. MAURO: Right, but listen.

3 DR. ANIGSTEIN: No, I'm
4 reinforcing.

5 DR. MAURO: No, I'm with you.

6 DR. ANIGSTEIN: You cannot say that
7 everything that falls to the ground is going
8 to be ground up to a 5-micron, you know, AMAD.

9 DR. NETON: But if it's not, Bob,
10 it's not a problem.

11 DR. ANIGSTEIN: Pardon?

12 DR. NETON: If it doesn't get
13 ground up, it's not a problem.

14 DR. ANIGSTEIN: No, for external,
15 it is.

16 DR. NETON: Right, external.

17 DR. ANIGSTEIN: But then we're
18 talking about internal.

19 DR. MAURO: You see, one of the
20 things, and Paul said it at the last meeting,
21 you know, a model is -- no model is right, but
22 it could be useful. All I'm trying to do is

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1 say to myself, listen, we're simplifying the
2 reality.

3 Of course, we are, in a way, and in
4 the end we want to be able to say that, well,
5 do we feel that in the end, if we use this
6 approach, will we be placed in a plausible
7 upper bound? And I guess I come down, and I'm
8 saying no.

9 Based on the data I look at, I say
10 no. Based on the data you look at, you say
11 yes, and we disagree, and that's fine. And
12 now you know the reason, my reasoning, for
13 better or worse. There may be flaws in it,
14 but there it is, naked for the world.

15 DR. NETON: I'm with you, John.
16 I'm a firm believer in empirical data and
17 looking at it. You know, you can have all the
18 models you want, but you take some empirical
19 data. It's best to compare it and see does it
20 make sense in the real world.

21 DR. MAURO: That's all Adley.

22 DR. NETON: That's what we need to

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1 do.

2 DR. MAURO: Yes.

3 CHAIR ZIEMER: Okay. I think,
4 rather than start the next issue, we will go
5 ahead and take our lunch break now. We will
6 reconvene at 1:00 our time. I guess that's
7 about, yes, 1:12, 11:10, about 10:00 your
8 time, Wanda, I guess.

9 MEMBER MUNN: Give or take a
10 little.

11 CHAIR ZIEMER: Give or take a
12 little bit. Okay. So we'll recess for lunch
13 at this point, and we'll put the phones on
14 mute or cut them off here.

15 MR. KATZ: Cut them off.

16 CHAIR ZIEMER: Okay.

17 MR. KATZ: Thank you everyone on
18 the phone.

19 (Whereupon, the above-entitled
20 matter went off the record at 11:54 a.m. and
21 resumed at 1:00 p.m.)

22 MR. KATZ: This is the Advisory

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1 Board on Radiation Worker Health, the TBD
2 6000/6001 Work Group, and we are reconvening
3 after lunch. Could I just check on the phone?
4 Wanda, do we have you and Mark? Do we have
5 you guys again?

6 MEMBER MUNN: You have Wanda.

7 CHAIR ZIEMER: Mark Griffon? We'll
8 check a little later. Maybe Mark will be
9 rejoining us. Okay. We are ready to address
10 in the TBD 6000 findings matrix Issue 6, which
11 is called Underestimate of Re-suspension
12 Factor.

13 The finding, in order to derive
14 upper bound default inhalation exposures due
15 to the re-suspension of uranium particles
16 deposited on surfaces, the TBD uses a default
17 re-suspension factor of 1×10^{-6} per meter.
18 Review by SC&A of literature addressing the
19 re-suspension factors indoors reveals that
20 this value might be low by about an order of
21 magnitude.

22 Considering that the default

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1 bounding surface contamination used in the TBD
2 might be low by one to two orders of magnitude
3 and that the default bounding re-suspension
4 factor might be low by an order of magnitude,
5 the default inhalation rate and the associated
6 doses associated with dust re-suspension
7 pathway might be underestimated in the TBD by
8 several orders of magnitude.

9 And to some extent this is a
10 continuation of the other issue but with the
11 focus on the re-suspension itself, which also
12 then leads to the internal dose issue. So
13 that was the finding, and NIOSH's response is
14 fairly brief, but, Dave, I'll give it to you.

15 MR. ALLEN: Yes, I mean, our
16 response was essentially that the re-
17 suspension factor is an important part of
18 OTIB-70. That one is already under review,
19 and I apologize. I'm not quite sure what
20 working group was reviewing that one.

21 CHAIR ZIEMER: Well, that would be
22 under the Procedures Work Group, I believe,

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1 since --

2 DR. MAURO: Well, it turned out
3 that was part of -- we did review it recently.

4 It was a special procedure that underwent
5 review, and I remember Hans giving a whole
6 presentation on that at one of our last
7 Procedure --

8 CHAIR ZIEMER: But that's not been
9 closed in any way.

10 DR. MAURO: No.

11 CHAIR ZIEMER: So that's -- if
12 these two are related, maybe we reserve
13 judgment until that one is completed, or do we
14 need to do that? What do we need to do here,
15 and --

16 MR. ALLEN: I'm just pointing out
17 that it's, you know, you've got two groups
18 doing the same thing. I think it's probably
19 one that could be consolidated somehow,
20 whether this group or the previous group or
21 whatever.

22 CHAIR ZIEMER: There is a whole

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1 range of re-suspension factors in the
2 literature, and they can vary with the surface
3 material. They vary with the chemical and
4 physical form of the material that's being re-
5 suspended.

6 I am a little rusty on it. Can you
7 remind me of sort of the range of numbers?
8 And I've actually seen -- it's probably in the
9 Chemical Rubber Handbook or one of those
10 tables where they give re-suspension factors
11 for different kind of activities and different
12 types of surfaces.

13 DR. MAURO: I sent it. There's an
14 attachment.

15 CHAIR ZIEMER: Is that in the
16 attachment here?

17 DR. MAURO: It's in the attachment.
18 In fact, I have -- this attachment is an
19 excerpt from previous work products that SC&A
20 --

21 CHAIR ZIEMER: Right. Oh, yes.

22 DR. MAURO: We summarized the

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1 literature, and to answer your question, 10^{-11}
2 to 10^{-2} , we're talking nine --

3 CHAIR ZIEMER: Yes, it's a big
4 range.

5 DR. MAURO: Nine orders of
6 magnitude.

7 CHAIR ZIEMER: Right.

8 DR. MAURO: So, yes, you're
9 absolutely right. It's enormous, and the
10 question is, is the 10^{-6} in the place where you
11 want it to be. I mean, that's really what it
12 comes down to.

13 CHAIR ZIEMER: Right and, I guess,
14 as I understand the finding, in a sense you're
15 saying justify that number versus one of the
16 other ones.

17 DR. MAURO: Well, no, we're strong
18 on that. We did review the literature. It's
19 summarized in the attachment.

20 CHAIR ZIEMER: Right.

21 DR. MAURO: And in there I think
22 the argument could be made that a 10^{-5} or a 5 x

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1 10⁻⁵ is a better number for the purpose in
2 which it's being used here.

3 DR. ANIGSTEIN: I think the point
4 made clear in our reply is that the 10⁻⁶
5 apparently was taken from NUREG-1720, which
6 was inadvertently omitted from the list of
7 references that was an email sent out to --

8 DR. MAURO: I emailed it, so you
9 have it.

10 DR. ANIGSTEIN: -- replace it.
11 That says NRC 2002, and that's the number that
12 NRC recommends for decommissioned facilities,
13 and this means floors have been cleaned.
14 They've been washed. There is nothing more
15 going on.

16 It's been released for public use
17 and for unrestricted use, and the residual
18 contamination that remains there has a re-
19 suspension factor of 10⁻⁶, and so if that's --
20 if that's the good number to use in that
21 instance, then for an active facility where
22 the deposition is occurring on an ongoing

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1 basis, it would seem intuitively that this
2 would be -- re-suspension factor would be much
3 higher.

4 CHAIR ZIEMER: Let me ask this
5 related question, however. The re-suspension
6 factor -- well, for a decommissioned facility,
7 you're concerned about a completely different
8 level of contamination in the air than you
9 would be for workers in terms of if you're
10 going to establish any kind of dose limits, so
11 maybe you could argue -- and I just put this
12 out as a thought.

13 Maybe one could argue, say, 10^{-6} of
14 a low level to start with, which is protecting
15 the public, versus 10^{-6} of a higher level for
16 workers. So talk to me about --

17 DR. ANIGSTEIN: The level -- I mean
18 --

19 CHAIR ZIEMER: I mean --

20 DR. ANIGSTEIN: The purpose of
21 establishing -- that NRC established the 10^{-6}
22 level is to calculate what is an acceptable

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1 limit of contamination on the surface so as
2 not to exceed, I believe, the 25 millirem per
3 year --

4 CHAIR ZIEMER: Right.

5 DR. ANIGSTEIN: -- you know,
6 release criteria.

7 CHAIR ZIEMER: Right.

8 DR. ANIGSTEIN: So it's backward,
9 so earlier -- and the reason 17, NUREG-1720
10 was prepared was earlier there was this
11 contract for NUREG-5512, Part 3, where they
12 had come up with much higher numbers, and it
13 was a problem, because they felt NRC and
14 probably the nuclear industry felt that this
15 was being too restrictive and that they were -
16 -

17 By using unrealistically high re-
18 suspension factors, they were limiting what
19 could be released or to be cleared and
20 increasing level, so when they went back and
21 restudied this, they said that for a
22 decommissioned facility where the floor, the

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1 surfaces have been already washed and cleaned,
2 10^{-6} is a conservative upper bound. I mean,
3 that was the whole intent of this NUREG.

4 CHAIR ZIEMER: Right. So the
5 argument there is if you haven't really
6 cleaned it, you're automatically going to get
7 a bigger percentage --

8 DR. ANIGSTEIN: Exactly.

9 CHAIR ZIEMER: -- of re-suspended,
10 simply because the source term to start with
11 is greater.

12 DR. ANIGSTEIN: Well, it's loose,
13 the dust.

14 CHAIR ZIEMER: Yes.

15 DR. ANIGSTEIN: It's loose, and
16 it's also fresh --

17 CHAIR ZIEMER: Right.

18 DR. ANIGSTEIN: -- because even if
19 you didn't clean --

20 CHAIR ZIEMER: Whereas if the --

21 DR. ANIGSTEIN: Even if you didn't
22 clean but just locked the doors and walked

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1 away for months and came back, it would kind
2 of settle in for the outdoor, weathering in,
3 but here it's daily. It's fresh stuff.

4 CHAIR ZIEMER: Right.

5 DR. ANIGSTEIN: So just common
6 sense would say that if that 10^{-6} is good for
7 that number, then you've got to have something
8 considerably higher for fresh stuff.

9 CHAIR ZIEMER: So, NIOSH, your
10 response?

11 MR. ALLEN: The operational
12 airborne levels we use for TBD 6000 came from
13 air sample data from the facilities that would
14 include re-suspension during the operation. I
15 believe the only time we used the 1^{-6} was for
16 after shutdown.

17 DR. NETON: After shutdown, yes.
18 These were basically shut-down operations.

19 DR. ANIGSTEIN: Shut down but not
20 necessarily cleaned up.

21 DR. NETON: True.

22 DR. ANIGSTEIN: Right.

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1 DR. NETON: But if there is no
2 beneficial work going on in these facilities
3 at that time and they're not working with
4 radioactive material, then they are
5 essentially storehouses.

6 DR. ANIGSTEIN: Yes, I understand.
7 Okay.

8 DR. NETON: So that's what I'm --

9 DR. MAURO: So you're saying that
10 the re-suspension factor of 10^{-6} per meter is
11 something that you would use only for a
12 facility that was inactive, the materials
13 aged, whatever is residual, and therefore,
14 under those circumstances, 10^{-6} starts to look
15 a little better. That's for sure.

16 DR. ANIGSTEIN: Yes, but, again, if
17 it hasn't really been --

18 DR. MAURO: Cleaned.

19 DR. ANIGSTEIN: -- washed down --

20 DR. MAURO: You know --

21 DR. ANIGSTEIN: -- it wouldn't be -
22 - it still may not be --

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1 DR. MAURO: What might be helpful
2 is, you know, we did the best we could to --
3 Table 1 in this attachment, it really just
4 says, listen, we went into the literature, and
5 we tried to see what the world is saying about
6 indoor re-suspension factors, and there is no
7 doubt that 10^{-6} is very often seen, but when
8 you look at the whole picture, you say, hmm,
9 is that the number I want to use for a default
10 upper bound value or reasonable for the
11 purposes in which you're using it?

12 And I come away saying, I would
13 have gone with something a little more
14 restrictive, something closer to 10^{-5} , and I
15 think that really, you know, it's really a
16 judgment call at this point.

17 You know, where do you put that
18 number? I would have put it around 10^{-5} , maybe
19 even as high as 5×10^{-5} , you know, and if you
20 folks feel that for the reason you just gave
21 maybe 10^{-6} is better, this is -- you know,
22 given the uncertainties, this is really a

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1 judgment call, and that was our point.

2 CHAIR ZIEMER: Okay, yes, and you
3 mention in your reply that -- or it says,
4 clearly, neither of these assumptions apply to
5 an operating facility, the assumptions that
6 they had made, but Jim is saying, yes, but
7 we're not using it.

8 DR. MAURO: I didn't understand. I
9 thought you were using this to do -- as part
10 of -- this was part of the way in which you
11 were modeling operations, also.

12 DR. NETON: No, and I think that
13 wouldn't make sense, because the models were
14 based on air sampling that was taken during
15 the operational period, so normally re-
16 suspension is built into those general air
17 samples. We only use re-suspension factors
18 like that once the operation is shut down, and
19 that was really the point of this TIB-70 was
20 how you model residual contamination in atomic
21 weapons in employer facilities was the whole
22 point of having two.

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1 DR. MAURO: Well, I mean, think we
2 are moving closer, and that's good. What we
3 have here is we agree that when you have a
4 place that's been decommissioned, where
5 basically you've cleaned it up, and you're
6 ready to release it for unrestricted use, and,
7 you know, you want to place an upper bound on
8 what the exposures might be to future
9 occupants of this facility that now has been
10 cleared by the NRC that a re-suspension factor
11 of 10^{-6} would be a good number.

12 On the other extreme, we are saying
13 that, well, if you have an operational
14 facility, it has fresh contamination. It's
15 loose. A number more like 5×10^{-5} is probably
16 a better number. So it's someplace between
17 those two numbers that you have placed
18 yourself.

19 Well, we're saying, well, we really
20 don't have a cleaned-up facility, but we do
21 have a facility where you don't have a lot of
22 people walking around kicking up the dirt.

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1 It's been sitting there, perhaps closed for
2 some time. There are no operations going on.

3 What would be a good number to place in
4 there?

5 You know, and I'd be the first to
6 say, well, it's probably going to be someplace
7 between those two numbers, and where a
8 reasonable place is, you know, that's a tough
9 judgment to call, but right now I guess I'm
10 coming down -- I think 10^{-6} may be a little bit
11 too far in one place, but now that you've
12 clarified 5×10^{-5} might be a little bit too
13 big.

14 DR. ANIGSTEIN: But, again, if you
15 say nobody is walking around kicking up the
16 dirt, well, if nobody is walking around,
17 nobody is breathing the air, so once somebody
18 comes in and gets exposed, I mean, goes in
19 there, he's going to stir up his own dust
20 cloud.

21 DR. NETON: Right, but the other
22 2,000 hours, work hours in a year, right?

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1 MR. ALLEN: Yes, we've got other
2 favorable assumptions, but the other end of
3 that is if people are in there, I think you
4 can make the assumption that the work --
5 they're doing something, and typically if
6 that's a place where you're going to get dust
7 on the floor, then they're going to now be
8 getting it with steel something, you know, or
9 something covered --

10 DR. MAURO: Oh, yes, there is no
11 doubt that, for example, if it was a steel
12 mill, and I think they did a very nice job on
13 that in Bethlehem Steel, where you factored in
14 that you were layering in, so, I mean, I'm
15 fine with it, but, you know, I just look at
16 this.

17 You know, here is a generic,
18 universally applicable TBD, and you decided
19 for the residual period to use 10^{-6} as a re-
20 suspension factor. All I'm saying is that, I
21 guess, in my opinion -- all right, maybe I'll
22 buffer it down. I said more than a factor of

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1 ten. It could be on the order of a factor of
2 ten, maybe a little less, you know, but I
3 think 10^{-6} is coming in on the low end. How
4 important it is --

5 DR. NETON: There is also sort of
6 this dual process going on. The more you re-
7 suspend, the shorter it's there, and it goes
8 away quicker.

9 DR. MAURO: Right, the residence
10 times.

11 DR. NETON: I mean, so I think it
12 almost comes out in the wash, to be honest
13 with you.

14 DR. ANIGSTEIN: It doesn't go away,
15 unless it's ventilated.

16 DR. MAURO: It could be that,
17 though. That's what the whole TIB-70 does.

18 DR. ANIGSTEIN: I mean, in that
19 case it could settle down.

20 DR. MAURO: I mean, it's not
21 complicated. What I'm saying here is not
22 complicated. Here is the literature. You

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1 know, here's the literature. You guys look at
2 it. You say, hmm, you know, and you come down
3 where you come down.

4 DR. NETON: Look, I agree with
5 Dave. I'm not sure whether we want to take
6 this up here or if this is fundamentally part
7 of TIB-70, as well. I mean, we can --

8 CHAIR ZIEMER: What's the status of
9 TIB-70? You've done a critique on it?

10 DR. MAURO: Under active review.
11 We've completed our review, submitted our
12 report, and we have had one meeting where we
13 discussed --

14 CHAIR ZIEMER: Is it exactly the
15 same issue?

16 DR. NETON: The 1×10^{-6} is clearly
17 the same exact --

18 DR. MAURO: Yes. It's a subset,
19 yes.

20 CHAIR ZIEMER: It's the same value
21 under the same conditions?

22 DR. MAURO: Yes.

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1 DR. NETON: Under residual
2 contamination or under inactive facility,
3 exactly. How do you handle residual
4 contamination periods at AWE facilities?

5 DR. MAURO: Exactly.

6 DR. NETON: This is especially how
7 you're getting --

8 MEMBER MUNN: I've been trying to
9 get on the server to give you an update of
10 exactly where we were with each of those
11 instances.

12 CHAIR ZIEMER: Okay. Go ahead,
13 Wanda.

14 MEMBER MUNN: The server doesn't
15 let me, so I can't help you.

16 CHAIR ZIEMER: Oh, okay. I thought
17 you were ready to go with that. Okay. We
18 certainly don't want to close this out if you
19 still have it open, but it's part of a --
20 there is other issues in that one that you're
21 dealing with, I think, right?

22 DR. NETON: I'm wondering. This is

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1 probably pretty prescriptive, and so I haven't
2 read this 6000 in a while on the residual --
3 on the residual period, but it seems to me
4 that TIB-70 supersedes what might be in here.

5 CHAIR ZIEMER: That's what I'm sort
6 of asking.

7 DR. NETON: To some extent, I mean,
8 is it possible to just remove that from here
9 and refer to TIB-70 for that piece of this
10 reconstruction? I don't know. I'm just --
11 you know, it's --

12 MR. ALLEN: Yes, I think we can, I
13 mean.

14 CHAIR ZIEMER: Or we will make sure
15 they're compatible.

16 DR. NETON: Well, at some point I'd
17 like to have it in one place, so if we change
18 it once, we don't have to worry about where
19 else it might occur.

20 MR. ALLEN: Yes, actually, that's
21 probably the best bet on this one, because we
22 were -- TIB-70, that idea was being kicked

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1 around when this was written, and really
2 wanted that, but it wasn't ready.

3 DR. NETON: I honestly thing TIB-70
4 is a little -- it has a few more options in
5 there.

6 DR. MAURO: Oh, yes.

7 DR. NETON: It allows for more than
8 just the one type of --

9 DR. MAURO: It's a very rich tool.

10 DR. NETON: It provides some
11 professional judgment options in there,
12 depending on the facilities, and so I think
13 that it might be best just to remove any
14 reference or direct the user of this document
15 to TIB-70 for guidance on that, and we can
16 consolidate it.

17 CHAIR ZIEMER: That appears to be a
18 good solution, because it will -- well, no.
19 Well, two open ones being solved in a
20 different manner, number one. Number two, if
21 that's the one that is more comprehensive,
22 then it's proper to refer to it, and we would

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1 show it as being transferred. Is that the
2 terminology we're using, transferred?

3 DR. MAURO: Yes.

4 MEMBER BEACH: As John is reviewing
5 it, we won't lose the discussion here.

6 CHAIR ZIEMER: But it will show it
7 in our documents.

8 DR. MAURO: We comment on that in
9 TIB-70, yes.

10 CHAIR ZIEMER: So we'll transfer to
11 the work group on procedures.

12 MEMBER MUNN: Thank you so much.

13 CHAIR ZIEMER: Same people. We
14 just change our hats. I'm on that one.
15 You're on that one. Mark's on that one.

16 MR. KATZ: I just want to make it a
17 priority to put it to bed so that the petition
18 issues can be --

19 CHAIR ZIEMER: Right. Okay, any
20 other comments on this one or questions?
21 We're agreed to transfer that. Okay, Issue 7.

22 DR. NETON: My favorite.

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1 DR. MAURO: You're going to love
2 this one.

3 CHAIR ZIEMER: Use of Deficient
4 Methodology for Estimating Inadvertent
5 Ingestion of Uranium. Internal doses
6 associated with the inadvertent ingestion of
7 uranium are derived in the TBD using models
8 and assumptions that have been discussed with
9 NIOSH in the past as part of the review of
10 numerous site profiles and exposure matrices.

11 Based on these discussions, it is
12 our understanding that NIOSH would agree that
13 the basic methodology described in the TBD is
14 deficient and should be revised when the
15 overall revised methodology is developed, and
16 NIOSH's response is basically if the
17 methodology is changed, as a result the change
18 will be incorporated in this TBD, but --

19 DR. NETON: Yes, I think I can take
20 this one.

21 CHAIR ZIEMER: Where are we on
22 that?

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1 DR. NETON: I presented our
2 position on this to the Advisory Board back in
3 January of 2008 at the Las Vegas meeting,
4 where I went over our analysis of the
5 suggested issue, and what we did was we took
6 the original model that was developed in TIB-
7 9, and I think SC&A evaluated that in their
8 review where we compared it to some values
9 that you could use in RESRAD, the RESRAD build
10 program, and use the full range, the range of
11 the uniform distribution, and pretty nicely
12 demonstrated that the values that you come up
13 with in 2009 are fairly consistent or very
14 consistent with what you would get using the
15 RESRAD build model based on surface, starting
16 with surface contamination.

17 The big disconnect between SC&A and
18 NIOSH is do you start -- what is the starting
19 point for ingestion? How much can a person
20 reasonably ingest per day? SC&A has argued
21 from the very beginning that -- I think they
22 started with 100 milligrams per day as a

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1 reasonable number. They have since come down
2 to 50, because there's a Calabrese, I think,
3 paper that came out.

4 DR. ANIGSTEIN: No, it's the -- 50
5 is the recommended value for adults in the
6 exposure, the EPA Exposure Factors Handbook
7 for B

8 DR. NETON: Right, and that was
9 based on a paper by Calabrese in 1995, which
10 you cited.

11 DR. ANIGSTEIN: Well, it was --

12 DR. NETON: Well, let me -- bear
13 with me, Bob. I've gone over the literature
14 again, and these methods have flaws to begin
15 with. There's all kinds of uncertainty
16 associated with these, but they were primarily
17 developed for measuring ingestion for cleanup
18 of contaminated waste sites.

19 They are not -- they are nowhere
20 near generated for determining occupational
21 type ingestion exposures, not even close.
22 These are 24/7 type ingestion that are

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1 calculated using capsules of tracer materials,
2 using methods of standard addition to
3 determine what comes out in the feces, and
4 that kind of analysis, and there is a number
5 of papers out there that challenge the
6 accuracy of those models.

7 Nevertheless, Calabrese, with
8 Stanek as the first author, in 2000 -- in '96
9 actually released a second pilot study of the
10 soil ingestion, and now they're saying that
11 maybe a better estimate is 10 milligrams per
12 day for an average value, and the median value
13 was actually one.

14 So, you know, these keep coming
15 down, and I still question the applicability
16 of this technique to an occupational exposure
17 study. In fact, that's the exact reason why
18 RESRAD, Bill, chose to ignore those values and
19 go with a model where how many times one
20 person can actually to go their hands and
21 mouth, you know, put it in their hands and
22 come up with the intakes that way, and that's

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1 what we've chosen to use, and that does come
2 down closer to five milligrams per day, but I
3 think it's more consistent with the
4 occupational setting compared to this
5 environmental setting that you guys have been
6 touting for a number of years.

7 DR. MAURO: We're not -- when we
8 engage in discourse, I hear what you're
9 saying, and I recognize the limitations of the
10 studies, and, remember, we said, "Yes, you're
11 right." The 100 and the 50 number may have
12 certain deficiencies how they got to it.

13 Then you came up with the .5, which
14 you're right. Charlie Yu used it as a default
15 value in the RESRAD, and so we're at a point
16 where we're saying, "I really --," you know.

17 So we did something a little
18 unusual, and you might get a kick out of this.

19 I asked Bob to put into a little
20 glass vial .5 milligrams, and I want you to
21 visualize now. You're working in a steel --
22 not a uranium, a weapons, AWE facility, all

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1 right. There's uranium flakes coming down.
2 Particles are settling. I understand it's
3 actually you can see the stuff on surfaces.

4 Some of it might be falling on the
5 cup. Some of it might be falling on the
6 sandwich, not unlike you're at a beach when
7 the wind is blowing. You eat a sandwich. You
8 get a little grit, you know, so, in other
9 words, it's not a clean place.

10 So I said, you know, "How much is
11 .5 milligrams?" All right, you're not going
12 to believe this. Pass around the vial, okay.
13 This is .5 milligram.

14 DR. ANIGSTEIN: I'm going to even
15 pass around the magnifying glass. In the
16 bottom of this, sort of try to keep it like at
17 an incline, this way, and see it. There is a
18 big chunk and a little chunk. This is
19 something. This happened over the weekend.

20 DR. MAURO: Oh, he did his own.

21 DR. NETON: And I happen to have a
22 shoulder bag that I had taken to the beach in

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1 the summer, and that's sand stone in the
2 crevices. I just dug up some sand, examined
3 it. By the way, I don't have an analytical
4 balance at home, but I did have a micrometer.

5 So I examined the sand grains and,
6 you know, measured samples of them, and found
7 a big one, some bigger ones, and assuming that
8 this is clear, which it's not -- it's more
9 like an oblong, ovoid shape, and when the
10 micrometer comes down, automatically you're
11 getting the smallest diameter, because it is
12 trying to push it down.

13 But assuming it's a sphere, and
14 assuming it's pure quartz, which is a pretty
15 good assumption, because it's clear, this
16 happens to come out to almost exactly .5
17 milligrams within a percent or so, and then
18 along side it is a very small one, and that
19 one I estimate to be .01 of a milligram.

20 So we could envision either
21 swallowing one big one or 50 little tiny ones
22 in a day, and it does not amount to anything.

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1 It's a very, very tiny entity and just,
2 again, for illustration. Whoever is
3 interested in seeing this, look at the --
4 again, look at the bottom corner, the lowest
5 part of the vial.

6 The big one you can see with the
7 naked eye. The smaller one you need the
8 magnifying glass for. Now keep this lower.
9 Keep it -- don't -- yes, because there's holes
10 in the cap when we go to see it.

11 DR. NETON: I'll pass.

12 DR. MAURO: Jim, I was going to
13 call you. I was going to call you on Friday
14 and say, "Jim, do you guys have analytical
15 balance in your lab?" You know, you could --
16 I would -- because we did this --

17 DR. NETON: Let me rebut that by
18 saying we don't use .5 milligrams per day. We
19 use the surface contamination dependent model,
20 how many times a person can mouth their hands.
21 This is more based on first principles by
22 mouth to hand.

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1 DR. ANIGSTEIN: I know. I know.
2 I'm familiar with --

3 DR. NETON: And if you look at the
4 comparison we did on our chart, for a very
5 high surface contamination we can allow 10
6 milligrams per day.

7 DR. ANIGSTEIN: Oh, I was looking
8 at --

9 DR. NETON: Dependent upon the sort
10 of contamination that's there, and that's
11 really what's more important, because you
12 can't just ingest pure uranium. I mean,
13 you're going to ingest uranium that's
14 contaminated with other inert materials, and
15 that's part of the contamination mix, so you
16 have to account for that. This absolute
17 ingestion per day does not make any concession
18 for the amount of material, the fraction of
19 material that's present in that.

20 DR. ANIGSTEIN: Oh, no, it's
21 supposed to. I mean, I've used the eaten
22 model in studies for EPA and for NRC, and we

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1 say, "This is the amount of dirt someone takes
2 in." Now what fraction of that dirt is
3 radioactive material that's already factored
4 in?

5 DR. MAURO: Remember, we're talking
6 -- I mean, I don't know if I -- I understand
7 what you're saying, but, you know, remember
8 what we're talking about. We're talking about
9 an AWE facility where they are grinding and
10 where the stuff is on the surface.

11 It's a dirty place, and the stuff
12 that's on the surface is this residue of
13 uranium oxide, and that's what the hand-to-
14 mouth behavior is bringing in. Now, whether
15 or not it is commingled with some other dirt -
16 - okay.

17 DR. NETON: I forget what it was,
18 but the way the model works is you mouth the
19 entire surface of your hand every hour or
20 something like that. I forget the exact
21 number. It's a very generous amount of
22 licking of the surface of your hand. It

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1 essentially comes out the units are square
2 meters per day or per hour.

3 DR. ANIGSTEIN: Okay.

4 DR. NETON: And so how many square
5 meters per hour you would effectively end up
6 ingesting that's on the ground, and I don't
7 know.

8 DR. MAURO: I've got to tell you, I
9 look at this, and I say, No. I have to say I
10 say, no. I mean, this is --

11 DR. NETON: My point is we're not
12 saying there's .5 milligrams per day.

13 DR. MAURO: That's too little.

14 DR. NETON: We're saying that it's
15 a fraction of what's on your hand. That .5
16 milligrams starts with the lower bound.

17 DR. ANIGSTEIN: Where I got the .5
18 milligrams from was from -- maybe it's changed
19 now. From your TIB-9, it relates to the air
20 concentration, and the .5 milligrams comes out
21 if you have an air concentration of something
22 like five milligrams per cubic meter, some

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1 high end. There was some fairly high air
2 concentration gives you that .5. Now, if
3 you're not -- if you're using a different
4 methodology now, then --

5 DR. NETON: No. No, we're not, but
6 I'm just saying that --

7 DR. ANIGSTEIN: I don't have the
8 mind of the TIB-9.

9 DR. NETON: I mean, but it makes
10 sense to me. Like say if you have 11 dpm --
11 I'm looking at the values that we had in this
12 table. If you have 2,000 dpm per cubic meter,
13 we would predict that that would have a
14 surface concentration of 54,000 dpm per square
15 meter, and then we would predict that you
16 would ingest every hour in that facility about
17 50 dpm per hour, so in a ten-hour day, 500 dpm
18 of uranium.

19 CHAIR ZIEMER: This is pure oral.

20 DR. NETON: Which is about half a
21 milligram.

22 DR. MAURO: Listen. I mean, we

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1 would -- we discussed the numbers in terms of
2 the literature, what Charlie Yu had to say and
3 his rationale, and with the -- and the other
4 extreme, the other distribution where it was -
5 - where it was 50 milligrams.

6 I mean, all I had -- and I was
7 sitting there thinking, "But I don't know
8 what's right. I don't know what the right
9 answer is to this," so that's the only reason
10 we did this, and I have to say common sense
11 tells me I don't -- you know, if this is .5
12 milligrams, I find it hard to believe that
13 this is claimant favorable. That's all. I
14 mean, it's as simple as that.

15 CHAIR ZIEMER: But the numbers in
16 the chart are milligrams of the uranium
17 fraction of the total ingested.

18 DR. NETON: It's total uranium
19 ingested per day, not what the total mass was.

20 CHAIR ZIEMER: Right, the mass may
21 be much greater.

22 DR. MAURO: Right. That's right.

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1 DR. NETON: The mass could be much
2 greater than that. I don't know what the mass
3 ingested per day is. I don't need to know
4 that. All I need to know is how much uranium
5 they ingested. You can't say half a milligram
6 a day equates to their total ingested --

7 DR. MAURO: Let's say it's U308 or
8 UO2, whatever it is on the ground, all right,
9 on the surface. The mass is all uranium.

10 DR. NETON: But, John, what's the
11 transfer factor of a surface contamination to
12 the hand, to the mouth? These are things that
13 you --

14 DR. ANIGSTEIN: It's not the only
15 possible contamination. I mean, there is --
16 for instance, the inhalation model deals only
17 with what goes into the lung. For instance,
18 what goes into the nose, 50 percent gets
19 expelled, and some of that can end up getting
20 swallowed, you know.

21 DR. NETON: That's taken care of in
22 our inhalation model.

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1 DR. MAURO: No, only the trachea --
2 the tracheobronchial clearance is swallowed.

3 DR. NETON: Anything that is
4 smelled is swallowed.

5 MEMBER POSTON: No, that's not
6 true, John.

7 DR. MAURO: It's also what's in the
8 mouth and what's in the nose.

9 DR. POSTON: Depends on what's in
10 the nose and swallowed.

11 DR. ANIGSTEIN: Not correct. The
12 fraction -- I've been looking at the model.
13 The fraction that gets caught in ET1, you
14 know, it's not considered to be part of the
15 party, so if you blow your -- in other words,
16 it's only what goes past.

17 DR. NETON: If you blow your nose,
18 but then you don't swallow it.

19 DR. ANIGSTEIN: It can be -- it can
20 accumulate in the nose. It can get aspirated,
21 you know. You know, you can suck it in. It
22 can go from the back of the nose, into the

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1 mouth, and then get swallowed. You know,
2 that's not uncommon. There are many
3 mechanisms by which it can be ingested without
4 having to -- it's not just, you know, licking
5 the hand, and --

6 CHAIR ZIEMER: But you're not
7 including that here, are you?

8 DR. ANIGSTEIN: No. My, I mean, my
9 point is, you know, when we have here -- I
10 mean, I'm just being now legalistic. If there
11 is a government agency that already has a
12 published policy for exposure on -- I mean,
13 obviously it's not -- it's not going to --

14 DR. NETON: It's not occupational.

15 DR. ANIGSTEIN: True. It's not
16 occupational. It's residential.

17 DR. NETON: Environmental.

18 DR. ANIGSTEIN: Well, residential,
19 but it's not like breathing. The person --
20 there is never any assumption that this person
21 will be ingesting 24 hours a day, just
22 enjoying his normal activities during the day.

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1 DR. NETON: That's part of my
2 problem with those models, Bob, is these are
3 capsules that are swallowed, and they do not
4 discount the fact that all the material that
5 person breathes and is cleared through the
6 nose and swallowed in the fecal excretion.

7 DR. ANIGSTEIN: I guess I'm just
8 going by the fact that if this was already
9 established policy of the Environmental
10 Protection Agency -- I'm deliberately using
11 its full name right now -- why should that not
12 be considered a claimant favorable assumption
13 here, whereas the RESRAD model is a model, and
14 the number, the default numbers in the RESRAD
15 code are simply a matter of convenience?

16 They are there, but it's up to the
17 user to accept them or to change them. It
18 comes up on the screen, and you put in
19 whatever values you want. So that's not a
20 policy decision made by a government agency to
21 decide, yes, the RESRAD -- the default RESRAD
22 value is a good number.

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1 DR. NETON: You can't compare the
2 Environmental Protection Agency to the
3 occupational --

4 DR. ANIGSTEIN: Pardon? Excuse me?

5 DR. NETON: You can't compare the
6 Environmental Protection Agency limits for
7 residential exposure to an occupational work
8 environment.

9 MEMBER POSTON: For anything.

10 DR. ANIGSTEIN: What's the
11 difference between someone living in --

12 DR. NETON: Why don't we use those
13 conversion models, then, that the EPA puts out
14 for environmental exposure? Why do we have
15 our own occupational, you know, dose
16 conversions?

17 DR. ANIGSTEIN: I don't think they
18 are any different except for the one micron --

19 DR. NETON: The breathing rate, the
20 one micron, the five micron particle size, the
21 --

22 DR. ANIGSTEIN: The five-micron

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1 particle size is simply --

2 DR. NETON: I'm not going to argue
3 with you, Bob, whether EPA models are
4 applicable here. I don't think they are. I
5 think an occupationally derived model put out
6 by -- sponsored by the Nuclear Regulatory
7 Commission to evaluate occupational exposures
8 is more directly relevant.

9 DR. ANIGSTEIN: And what did
10 Nuclear Regulatory Commission put out? I'm
11 not aware that they have a number.

12 DR. NETON: Well, they've adopted
13 these values.

14 DR. MAURO: They put out that --
15 they use RESRAD, whether they have adopted the
16 point. Well, look, I mean, you know, we've
17 been --

18 DR. ANIGSTEIN: A NUREG for
19 recycling put out by the Nuclear Regulatory
20 Commission uses the value of 50 milligrams.
21 They use a range of zero to 20 milligrams per
22 hour for occupational exposure for inadvertent

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1 ingestion. That's an NRC document. I just
2 happen to have a little to do with it, but
3 it's not a contractor NUREG.

4 DR. NETON: I think that it is
5 inappropriate to assume 50 milligrams per day
6 ingestion of uranium in the workplace. It's
7 just ridiculously low.

8 DR. MAURO: I know. This is 50
9 milligrams. Look at this thing.

10 DR. NETON: That's --

11 DR. MAURO: This is 5. I'm sorry.
12 This is .5 milligrams. I find it impossible
13 to say that this is claimant favorable. I
14 can't. I mean, I can't do it. It's too
15 small. You know, I could inhale this and put
16 this somewhere. I wouldn't even know what
17 happened.

18 DR. NETON: But, John, it's not .5.

19 Only under very low exposure conditions where
20 the uranium is a very small component of the
21 inert material that's contaminated in the
22 first --

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1 DR. MAURO: But that's not the case
2 for AWE. The purpose of this is just for
3 those early year AWE facilities.

4 DR. NETON: But it depends upon --
5 our model depends upon the air concentration
6 that generates the surface contamination. It
7 goes up and allows for the fact that as the
8 facility becomes more and more contaminated,
9 we allow for more and more ingestion. That's
10 the nice part of this model.

11 Your model would assume that a
12 person would ingest 50 milligrams of uranium
13 per day if they didn't process a small amount
14 of uranium. You know, how would you account
15 for that? I ran one uranium sample through
16 here, and therefore I need to ingest 50
17 milligrams of uranium in one day.

18 DR. ANIGSTEIN: No, it's not 50
19 milligrams of uranium. It's 50 milligrams of
20 total --

21 DR. NETON: And how would you
22 partition that?

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1 DR. ANIGSTEIN: Depending on --
2 just like with the steel mills when you say
3 there is so much uranium and so much steel
4 dust, like Bethlehem Steel.

5 DR. NETON: I don't find that's any
6 different than what we're partitioning here
7 based on the actual surface concentrations
8 available for ingestion.

9 DR. MAURO: Your number says that
10 with default airborne dust loading, depending
11 on where you look it up in your table, it's --
12 in the TBD 6000, basically you have different
13 categories of workers where the air dust
14 loading could be fairly high or not so high.

15 Then the ingestion rate is, if I
16 remember, .2 times the air concentration,
17 whatever that is, in milligrams per cubic
18 meter, is the ingestion rate in milligrams per
19 day, and I believe when you do the numbers,
20 you come up with something that turns out to
21 be about .5 milligrams per day, and I have to
22 say, when we got into this discussion, my

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1 answer was, I don't know what the right answer
2 is.

3 I hear why you don't like the 50,
4 and I didn't have any argument to say why .5
5 was good or not, and then all I did was
6 something which you all may consider it to be
7 silly, but I said, "How much is .5
8 milligrams?" Now, it's really small. I mean,
9 it's really, really small, and common sense
10 would argue, "Well, that's --."

11 Now, you're arguing that, but wait
12 a minute. The stuff that's on the surface is
13 really a mixture of uranium with other stuff,
14 and I say no. So the stuff that's on the
15 surface at these AWE facilities is uranium
16 oxide. That's the dust that's settling.

17 DR. NETON: No way.

18 DR. MAURO: That's the residue.

19 DR. NETON: It's a smear. Have you
20 ever taken many smears? If you take a smear
21 and observe it, if it's a visibly dirty smear,
22 there is no way that the 300 picocuries you

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1 measure on there, all that mass, is due to the

2 --

3 DR. MAURO: 1949, 1950, 1951, AWE
4 facilities doing grinding, and we've heard the
5 stories about the sources.

6 DR. NETON: If you have 50,000 dpm
7 per square meter on the surface, then we will
8 allow for 10 milligrams per day ingestion of
9 uranium. That's my point.

10 DR. MAURO: That comes out, you
11 will come out with a 10 milligram per day.

12 DR. NETON: Well, a real high
13 value. I forget what it comes out to. This
14 is per square meter, so for 100 square
15 centimeters it would have to be, yes, about
16 50,000, 42,500. Now 40,000 dpm for 100 square
17 centimeters, which is a pretty high smear,
18 would end up ingested somewhere in the
19 vicinity of 10 milligrams in a day of uranium.

20 When you smear things, it's not
21 uniform. You're not sitting in a seat.
22 Contamination where it would be completely

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1 covered with uranium -- help me out here,
2 Dave, here -- is hundreds of thousands of dpm.

3 It's a lot. I mean, uranium has a specific
4 activity of something like 600 picocuries per
5 milligram.

6 DR. MAURO: Right.

7 DR. NETON: 670, say 700. That's
8 1,400 dpm per milligram, so when you start
9 getting visible amount that you could see, as
10 you know, because that's a half a milligram --

11 DR. MAURO: Yes, that's right.

12 DR. NETON: If you can see a thick
13 crud on the smear, which I have seen you're in
14 the hundreds of thousands of dpm per hundred
15 square centimeters. So it's not like you
16 think, that they are like standing on this
17 carpet of uranium oxide.

18 When you have something in the
19 order of 500 dpm per hundred square
20 centimeters, what's on that smear is not all
21 uranium. It's a very large percentage of
22 inert material. That's where I'm coming from.

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1 Right there you have 300, maybe,
2 picocuries of uranium. That's going to be 600
3 dpm per hundred square centimeter smear of
4 uranium. I don't know. That's where --

5 CHAIR ZIEMER: Well, in fact, if
6 you take an air sample virtually anywhere, you
7 get the same thing. You get -- you're loading
8 with dust, which also typifies the surface,
9 because the dust plates out just like anything
10 else, and, well, in fact, in most air samples
11 you even have to take into consideration the
12 thickness of that. If you were sampling --

13 DR. MAURO: Oh, yes, self-
14 absorption, sure. Even if it's only uranium,
15 you'd have to use self-absorption.

16 CHAIR ZIEMER: Yes, so I, you know,
17 I don't intuitively feel it's unreasonable to
18 operate under the assumption that even in what
19 looks like a pretty clean facility you still -
20 - in almost any area you think of and any
21 surface, including my house, you wipe
22 something up, you get mass. There is mass

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1 there.

2 MEMBER MUNN: There's somebody
3 carrying on conversations in the background.
4 Someone isn't muted.

5 CHAIR ZIEMER: Okay. Let's --

6 MR. KATZ: For the people listening
7 on the telephone, please, if you don't have a
8 mute button, please use *6. There is a
9 conversation that's been going on, and
10 although it's not that loud in this room,
11 because I lowered the volume for other people
12 who are trying to listen on the phone, it's
13 disturbing and making it difficult for them to
14 hear. Thank you.

15 CHAIR ZIEMER: Let's see. I want
16 to check and see if Mark came back on the
17 line.

18 MEMBER GRIFFON: Yes, I'm here,
19 Paul.

20 CHAIR ZIEMER: Yes, Mark.

21 MEMBER GRIFFON: Hi, Paul, but I'm
22 having the same problem Wanda is having.

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1 CHAIR ZIEMER: Oh, okay.

2 MEMBER GRIFFON: I'm getting a lot
3 of background noise.

4 CHAIR ZIEMER: Okay. Did you have
5 any comments on this issue on the
6 contamination surface, contamination and
7 ingestion masses?

8 MEMBER GRIFFON: No, I mean, no, I
9 tend to think like John was saying, but I
10 haven't looked at those. You know, Jim's
11 explanation is compelling that if it is geared
12 to allow for higher values as the
13 contamination -- surface contamination gets
14 higher, then, you know, that model may account
15 for SC&A's concerns, so I haven't looked at
16 that in a while, but that is a compelling
17 argument.

18 DR. MAURO: But, Mark, keep in mind
19 that -- remember, this AWE, this is a generic
20 AWE, so it's not that -- they may not have
21 data. That's the whole point.

22 MEMBER GRIFFON: Yes, that's the --

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1 DR. MAURO: They don't have any --
2 they don't have data on the air dust loading.
3 They don't have surface contamination. They
4 don't have bioassay data.

5 The problem is that we're going to
6 assign to this particular worker who worked at
7 a facility where we don't have the data, and
8 on that basis, as I understand it, and this is
9 where I might be wrong, they are effectively
10 going to say, "Well, we're going to assume
11 that the person's ingestion rate is .5
12 milligrams per day of this residual uranium."

13 Now, I might be wrong about that.
14 That's not what you're doing. You know, I've
15 been operating on a --

16 MEMBER GRIFFON: That's a question
17 for Jim. I'd like to hear the answer to that,
18 too.

19 DR. NETON: You know, I'm not
20 familiar exactly with all the tables in 6000
21 right now, but it's air concentration
22 dependent, and depending on whatever air

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1 concentration was used as the upper bound
2 value for that facility, we would generate a
3 surface concentration, and I'm looking here at
4 this one table that I constructed a while ago.

5 An air concentration of like 11,000
6 dpm per cubic meter would effectively end up
7 ingesting about half a milligram per hour with
8 a surface concentration of 15,000 dpm per 100
9 square centimeters. I don't know. Maybe this
10 is one of the lower bounded values in the TIB
11 for some facilities.

12 DR. MAURO: Well, I'll be the first
13 to say if the .5 number that I've been
14 operating on the premise that that's
15 fundamentally where you're standing on, you
16 know, the Charlie Yu .5 milligrams per day, if
17 that's wrong, and I have been misunderstanding
18 --

19 DR. NETON: It's not .5 milligrams.
20 It's not a fixed value at all.

21 DR. MAURO: Okay. It's a function
22 of the air dust loading, and if it turns out

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1 in practice, in practice, when applying this
2 particular OTIB to a case, you're coming in at
3 milligrams per day, ten, whatever --

4 DR. NETON: It could be five.

5 DR. MAURO: Yes. Now we're in a
6 realm where it seems to be making a little bit
7 more sense to me.

8 DR. NETON: I think where you got
9 this .5 also is that when Charlie Yu was
10 looking at these models and he saw there was
11 some dichotomy in the data -- you know,
12 there's 50, and then there's these low values.

13 Then he said, well, let me think
14 about this 50 in an occupational setting.
15 Does it make sense? Could I mouth that much
16 material in one work day, in one hour, to get
17 a 50-milligram intake in a nuclear-type
18 facility? And he came to the conclusion, No.

19 And he said, well, there is this
20 lower bounded value that looks like it could
21 be .5, around there, and it fit better with
22 sort of the model you could develop where you

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1 say, okay, how much of your hand can you lick
2 every hour or would you predict a person would
3 lick?

4 And there are studies out there
5 that have done this, for instance, in
6 industrial hygiene areas. How often does a
7 person, you know, like their hands and smoke a
8 cigarette and that kind of thing?

9 And I think that fit much more in
10 line with this .5, although .5 was never, ever
11 used. We never intended to use that. It's
12 just consistent with that for very low levels
13 of concentration.

14 DR. ANIGSTEIN: My recollection is
15 using TIB-9 and using an upper-end air
16 concentration of mass loading, not dpm, just
17 mass loading in the air, it ends up at .5. I
18 don't have that in front of me.

19 DR. NETON: I've got numbers here
20 that I presented in January.

21 DR. ANIGSTEIN: Then if I was
22 wrong, I'm --

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1 DR. NETON: For air concentration
2 of 48,800 dpm per cubic meter --

3 DR. MAURO: How many MAC is that?

4 DR. ANIGSTEIN: It doesn't really
5 matter --

6 DR. NETON: 100 MAC?

7 DR. MAURO: That would be 70 axels.

8 DR. ANIGSTEIN: -- because it's a
9 unit, okay, so air -- wait a minute. Let me -
10 -

11 DR. MAURO: It would be 700.

12 DR. ANIGSTEIN: Let's get an
13 average. The air concentration, say this
14 again.

15 DR. NETON: 48,800 dpm per cubic
16 meter.

17 DR. ANIGSTEIN: 48,800, okay.
18 Let's call it 50,000, okay.

19 DR. MAURO: That's one of your
20 higher numbers, basically.

21 DR. NETON: Yes, you have a very
22 high steel level.

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1 DR. MAURO: If you have 70 MAC,
2 you're up there.

3 DR. ANIGSTEIN: Okay.

4 DR. MAURO: Absolutely.

5 DR. ANIGSTEIN: So we've got -- so
6 with 50,000 or 48,800 --

7 DR. NETON: 50,000 dpm per cubic
8 meter.

9 DR. ANIGSTEIN: So what's the
10 ingestion rate?

11 DR. NETON: The ingestion rate is
12 1,220 dpm per hour.

13 DR. ANIGSTEIN: So it's 1,220,
14 okay.

15 DR. NETON: So that's roughly --

16 DR. ANIGSTEIN: Let's go back to
17 the 48. So it's basically 1:40.

18 DR. NETON: Wait a minute. 1,200
19 is 600 picocuries, roughly.

20 DR. ANIGSTEIN: No, just on the dpm
21 it's roughly -- you just divide one by the
22 other, so you take the dpm --

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1 DR. NETON: That's about a
2 milligram per hour.

3 DR. ANIGSTEIN: Pardon?

4 DR. NETON: That's about a
5 milligram per hour.

6 DR. ANIGSTEIN: Okay.

7 DR. NETON: It's coming at a
8 milligram per hour.

9 DR. ANIGSTEIN: But what I'm saying
10 is --

11 DR. NETON: Well, 1,200 dpm is
12 roughly --

13 DR. ANIGSTEIN: -- you had 400. We
14 don't even have to do that. We can --

15 DR. MAURO: Well, let's see who
16 gets the number. We might be at the end.

17 DR. NETON: It will be about a
18 milligram.

19 DR. MAURO: We might be at the end.

20 DR. ANIGSTEIN: You have about
21 48,000 --

22 DR. NETON: 800.

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1 DR. ANIGSTEIN: We have 48,000
2 units, doesn't matter what they are, 48,000
3 units per cubic meter, and then -- just a
4 second. I want to get a ratio. And then you
5 are ingesting 1,220 units per hour, right?

6 DR. NETON: Correct.

7 DR. ANIGSTEIN: 1,220, okay, so the
8 ratio is 1:40 in terms of milligrams. Now, in
9 a reason -- a maximum dust loading, the
10 maximum dust loading allowed by OSHA is 5.
11 The OSHA PEL is five milligrams per cubic
12 meter.

13 DR. NETON: We've gone way beyond
14 that in these facilities.

15 DR. ANIGSTEIN: Okay, but I'm
16 saying the reason we don't get much higher
17 than that is we've got -- we've done a study
18 on that.

19 DR. NETON: Where were you on --?

20 DR. ANIGSTEIN: When you get much
21 higher than that, people just can't work in
22 that environment. It's not safe.

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1 DR. NETON: Well, don't go there,
2 Bob.

3 DR. ANIGSTEIN: Pardon?

4 DR. MAURO: -- did this breakdown,
5 because at Bethlehem Steel --

6 DR. NETON: You're going to
7 invalidate our entire Bethlehem Steel model.

8 DR. MAURO: Bethlehem Steel is 300
9 milligrams.

10 DR. NETON: 300 milligrams is --

11 DR. MAURO: You are unbreathable.

12 DR. NETON: Exactly.

13 DR. ANIGSTEIN: I thought we had
14 this report, you know, this comment from
15 Wesley Van Pelt, who said much more than 30
16 you can't even --

17 DR. MAURO: Right.

18 DR. ANIGSTEIN: It becomes --

19 DR. MAURO: 300, you're in trouble.
20 You can't go in the room.

21 DR. NETON: You can't go in the
22 room.

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1 DR. MAURO: That's why we were okay
2 with Bethlehem Steel.

3 DR. NETON: We said that was a --
4 it was a higher plausible upper bound.

5 DR. MAURO: Yes, and that's why
6 Bethlehem Steel, you know, so I hear what
7 you're saying. So you're -- so I see where
8 the breakdown is in the calculation. You're
9 blocking it at five milligrams. You're
10 saying, "No, your number is not five
11 milligrams. Your number is higher than that,"
12 and you're coming in at a milligram an hour.

13 DR. NETON: A milligram an hour.

14 DR. MAURO: This issue is closed.

15 CHAIR ZIEMER: You assumed it was
16 .5 across the board.

17 DR. NETON: A milligram an hour.

18 DR. ANIGSTEIN: No, I am assuming
19 that -- yes, because I just got -- by using
20 Jim's ratio, I had done it differently, but,
21 anyway, we were in the same ballpark, so by
22 using Jim's ratio I get that at five

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1 milligrams -- I think I was even thinking
2 lower than that, more like 2 milligrams time-
3 weighted average was a good number, and you go
4 1/40 of that. Then you come out with
5 something like .5 per day, you know.

6 DR. MAURO: That's not the case.

7 DR. NETON: That's not the case.

8 DR. ANIGSTEIN: We're talking about
9 very, very heavy -- you're talking about very,
10 very heavy dust loadings now.

11 DR. NETON: Most of our AWEs are
12 well above what you just talked about.

13 DR. MAURO: Yes.

14 DR. NETON: Well, well above that.

15 DR. MAURO: Good. There was -- we
16 actually had -- it takes a while. We had a
17 miscommunication here.

18 DR. ANIGSTEIN: Time weighted
19 average for an eight-hour day is more than
20 five?

21 DR. NETON: Oh, yes.

22 DR. MAURO: The miscommunication

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1 was --

2 DR. NETON: Way higher than that.

3 A hundred is not --

4 DR. MAURO: I was operating on the
5 premise that .5 milligrams per day was the
6 default ingestion rate effectively built into
7 this relationship, and it's wrong. What
8 you're saying is under a dirty environment,
9 you're on the order of milligrams per day, and
10 I'm perfectly fine with that.

11 MEMBER BEACH: Did we close one?

12 CHAIR ZIEMER: We need to have --
13 we need to have a -- we need to have a closure
14 statement here, but, John, you're in agreement
15 that what we're -- what we would be -- we
16 would be going with the original NIOSH
17 position on this. Josie, you okay with that?

18 MEMBER BEACH: I am okay with that.

19 CHAIR ZIEMER: And perhaps -- and
20 let me hear from Wanda and also from Mark.
21 Mark and Wanda?

22 MEMBER MUNN: A simple statement

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1 after discussion, "Agreement was reached. The
2 original NIOSH position is acceptable." That
3 should be fine.

4 CHAIR ZIEMER: And Mark? Did we
5 lose Mark?

6 MR. KATZ: Mark, do we still have
7 you?

8 CHAIR ZIEMER: Okay. I'll recap
9 for him when he comes back on, but we would
10 need to -- I guess the action would be that
11 after discussion with the contractor and
12 NIOSH, we agree that the original methodology
13 as described is acceptable.

14 MEMBER BEACH: I have a quick
15 question, though. How was it missed? Was it
16 just in numbers, or is it not clear in the
17 TBD? How did you --

18 DR. MAURO: We researched carefully
19 the basis for the OTIB 009, which is the OTIB
20 that describes ingestion.

21 MEMBER BEACH: Okay.

22 DR. MAURO: In going back through

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1 that process, which was very tortuous to try
2 to figure out what they did, we ended up
3 coming out at a place that said, "Oh, I think
4 I see what they're doing. It looks like they
5 have adopted Charlie Yu's .5 milligrams per
6 day as a default ingestion rate," okay, and I
7 have been operating on that premise ever
8 since.

9 MEMBER BEACH: Okay.

10 DR. MAURO: And it sounds like
11 operating incorrectly.

12 MEMBER BEACH: I just want to make
13 sure it's clear in 6000.

14 CHAIR ZIEMER: Well, there's
15 implications on 009, then, in terms --

16 DR. NETON: 009 has not changed.

17 CHAIR ZIEMER: No, but --

18 DR. MAURO: Somehow I got there.

19 CHAIR ZIEMER: No, but is 009 still
20 under review? Is it open?

21 DR. MAURO: It's still under
22 review. I believe it is. Unfortunately, we

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1 can't get online to get it, but I believe 009
2 is still under review.

3 DR. NETON: This ingestion issue is
4 the overarching issue that has been open for -
5 -

6 DR. MAURO: Forever.

7 DR. NETON: As a matter of fact --

8 MEMBER BEACH: Four years.

9 DR. MAURO: Four years.

10 DR. NETON: They pointed out in
11 their rebuttal there that --

12 CHAIR ZIEMER: But it's still open
13 in some other places. That's what I'm getting
14 at.

15 DR. NETON: Well, but I was
16 prepared to come here and say that this is one
17 of those issues where we can agree to
18 disagree, because we're not moving from our
19 position, but if SC&A has --

20 DR. MAURO: No, but no, more --
21 something important happened today. The
22 important thing was SC&A realized that we were

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1 operating -- I was operating on a premise that
2 this .5 was the number that you've been
3 working with, and you have convinced me, based
4 on the calculations that you just did, and,
5 no, it's not --

6 There may be certain circumstances
7 where, if it's a fairly clean environment, it
8 might go that far down. But if you're dealing
9 with dirty environments -- now, right now I'm
10 -- right now, the sensibility I have out of
11 all this is that when you apply TBD 6000 to
12 one of these unknown circumstances, you're
13 going to be assigning a fairly high default
14 airborne dust loading, and, in addition,
15 coupled with that, when you're at that high
16 dust loading, it automatically brings you into
17 milligram per day ingestion rates. As far as
18 I'm concerned, that's good.

19 MEMBER BEACH: And that is clear in
20 6000. That's just what I wanted to make sure,
21 because we were --

22 DR. NETON: That is something Dave

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1 is going to have to speak to.

2 MR. ALLEN: 6000 says, essentially,
3 use OCAS TIB-9 and then calculates some
4 numbers based on it.

5 MEMBER BEACH: Okay.

6 CHAIR ZIEMER: So we need to make -
7 - and TIB-9 is under review by Wanda's?

8 DR. MAURO: Yes.

9 CHAIR ZIEMER: So, Wanda, if you're
10 on the line, we need to make sure, because
11 we're in essence recommending closure of that
12 issue for TIB-009, I think.

13 MEMBER BEACH: 006 or 6000.

14 DR. MAURO: 6000.

15 CHAIR ZIEMER: No, but by
16 implication for 009.

17 DR. NETON: I want to rain on the
18 parade a little bit here.

19 CHAIR ZIEMER: It's another aspect.

20 DR. NETON: There is another aspect
21 to this calculation that we disagreed with,
22 and that is the conversion of air

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1 concentration to surface concentration. I
2 mean, you've already heard that discussion
3 this morning.

4 CHAIR ZIEMER: Right.

5 DR. MAURO: Yes, we have to be
6 careful.

7 DR. NETON: So, you know, I think
8 what I heard is there is an agreement that if
9 we do have an established surface
10 concentration, the use of our TIB -- our
11 factor is appropriate.

12 DR. MAURO: Yes.

13 DR. NETON: The ingestion --

14 CHAIR ZIEMER: Once you come to an
15 agreed-upon air concentration and surface
16 value.

17 DR. MAURO: Yes, because we still
18 have -- that's the one --

19 DR. NETON: Given the surface
20 concentration value we calculated, we're okay,
21 because we are allowing for milligrams per day
22 ingestion, so the approach that we've adopted,

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1 but it's the conversion from air concentration
2 to surface concentration that's still --

3 CHAIR ZIEMER: It may still be
4 open.

5 DR. MAURO: It's still open.

6 DR. NETON: We just demonstrated
7 that about an hour ago.

8 CHAIR ZIEMER: Right.

9 DR. NETON: We can't agree on that
10 for re-suspension factors, and that same
11 calculation applies to the ingestion issue.

12 CHAIR ZIEMER: But for this smaller
13 part we're okay.

14 DR. NETON: For this smaller part,
15 which is the --

16 DR. MAURO: What we're saying is
17 the concept of using .2, a factor of .2, which
18 is the -- if you know the airborne
19 concentration, and what we're really saying
20 here is you know the airborne concentration,
21 let's say, in Becquerels per cubic meter. You
22 multiply by .2, and you'll get Becquerels,

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1 that number. You'll get Becquerels per day as
2 being your ingestion rate, and I believe that
3 works.

4 DR. NETON: If a factor of .2 is
5 appropriate, then it works.

6 DR. MAURO: And it works, right,
7 and the reason I'm saying that is that, from
8 what I have heard, is this going to bring --
9 if you are dealing with a fairly high dust
10 loading in Becquerels per cubic meter, which
11 would be the circumstance in a very dirty
12 environment, in an early AWE facility --

13 DR. NETON: Right.

14 DR. MAURO: -- and I'm taking this
15 on faith. It's going to bring you into the
16 milligrams per day ingestion as opposed to .5,
17 and on that, given that, I'm comfortable with
18 that.

19 DR. NETON: I'm happy.

20 DR. ANIGSTEIN: The
21 misunderstanding was on what is a high dust
22 loading.

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1 DR. MAURO: Yes.

2 DR. ANIGSTEIN: And we're talking
3 about --

4 DR. NETON: You are privy to these
5 early conversations on the AWEs, where we have
6 gone to some very high levels, and, actually,
7 they did exist.

8 CHAIR ZIEMER: Do you have other
9 comments on that, or should we go ahead?

10 DR. NETON: I'm okay. I'll keep
11 quiet now.

12 CHAIR ZIEMER: While you're ahead.

13 DR. NETON: I'm ahead.

14 CHAIR ZIEMER: I think, then,
15 we're ready for Issue 8.

16 DR. MAURO: We're done here. We're
17 done.

18 CHAIR ZIEMER: I just want to keep
19 going here. Can't we find some new issues?

20 MEMBER POSTON: And then it'll look
21 like we closed a couple, anyway.

22 CHAIR ZIEMER: Very good. Okay.

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1 We're ready to move, then, to the Appendix BB
2 matrix, and let's -- we need to make sure
3 everybody's got the right document on this
4 one.

5 DR. ANIGSTEIN: Didn't we review
6 the matrix at the last meeting?

7 CHAIR ZIEMER: We reviewed it, yes.

8 MEMBER BEACH: The latest we have
9 is May 2.

10 DR. ANIGSTEIN: Nothing has been
11 added.

12 MEMBER BEACH: I haven't seen
13 anything.

14 CHAIR ZIEMER: If you look at the
15 matrix, well, we'll use -- we use the matrix
16 as the framework. We're not going to go
17 through issue by issue on that, because if you
18 look at it, you'll see that virtually every
19 issue says that there are -- NIOSH's response
20 basically says we have film badge data that
21 will be utilized, but I did want to pull the
22 matrix up here if I can find it.

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1 MEMBER MUNN: I'm having a hard
2 time finding what the date of the matrix is.

3 CHAIR ZIEMER: The original date of
4 the matrix is May 2 of 2008.

5 MEMBER MUNN: Yes, I have --

6 CHAIR ZIEMER: And then we had
7 NIOSH responses.

8 MEMBER BEACH: But we don't have a
9 date for NIOSH's responses?

10 CHAIR ZIEMER: Actually, I don't
11 see a date on the NIOSH responses, but may
12 have -- I guess I don't, but we have a version
13 of it that has the NIOSH's responses in it,
14 and they all say, "As indicated, NIOSH has
15 obtained film badge results for betatron
16 operators.

17 "We are in the process of comparing
18 this data to the model estimates provided by
19 both the Appendix and SC&A. The data includes
20 operators," and so on, and virtually every one
21 of the responses by NIOSH refers to the film
22 badge data.

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1 So I think our main focus here has
2 to be on that, and that will in turn allow us
3 to move forward one way or the other with the
4 matrix itself. I'm trying to see if there
5 were any here that didn't mention the film
6 badge data.

7 DR. ANIGSTEIN: Just a couple of
8 minor ones.

9 CHAIR ZIEMER: Well, there were
10 some other comments, but I think every --
11 well, there was one thing about the period of
12 covered employment, but that was a separate
13 issue. That was Issue 2, but the other issues
14 all mention the film badge data, I believe.

15 Well, there was the issue on
16 failure to assess other sources. Even on that
17 one, you -- let's see. You mention the film
18 badge data, also.

19 So, anyway, we need to -- we need
20 to go to the film badge issues, and we have
21 several papers that Bob prepared for us, and
22 so let me refer us to those, if you want to

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1 have those handy, and then we'll ask Bob to
2 walk us through, and also I want to double-
3 check and see if Dr. McKeel is on the line.
4 Dr. McKeel, are you with us this afternoon?
5 John Ramspott, are you still with us?

6 MR. RAMSPOTT: I definitely am, and
7 I know Dr. McKeel was going to join us.

8 CHAIR ZIEMER: I thought he was,
9 and that's why I wondered.

10 MR. RAMSPOTT: I'll send him a
11 quick email.

12 CHAIR ZIEMER: Well, that's fine.
13 I appreciate that, and he's had some
14 correspondence with Bob, and I think Bob will
15 share with us some of the information that Dr.
16 McKeel provided for him, but I was hoping he
17 would also be on the line in case he had
18 additional comments, as well.

19 MR. RAMSPOTT: I'm just now showing
20 1:00 our time, so maybe he's getting on in a
21 minute.

22 CHAIR ZIEMER: Okay. So we have --

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1 I think the original one was called -- was it
2 called white paper?

3 DR. ANIGSTEIN: Well, the white
4 paper was --

5 CHAIR ZIEMER: No, that was the
6 NIOSH paper.

7 DR. ANIGSTEIN: That was the NIOSH
8 paper.

9 CHAIR ZIEMER: That was the
10 analysis.

11 DR. ANIGSTEIN: Yes. There was a
12 response. There was an SC&A response to the
13 white paper. There was, I believe, a PA
14 cleared version of that that was distributed.

15 CHAIR ZIEMER: Right.

16 DR. ANIGSTEIN: And then there was
17 -- which dealt with a number of issues, not
18 just film badges. So then there was a more
19 definitive one, which somehow slipped through
20 the cracks and did not get PA cleared, the
21 review of the film badge symmetry report,
22 which was dated January 13.

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1 CHAIR ZIEMER: January 13 is --

2 DR. ANIGSTEIN: Right.

3 CHAIR ZIEMER: -- the first one, is
4 it not?

5 DR. ANIGSTEIN: Yes, and, yes, that
6 was the -- that was the review. Okay, that
7 was a review that was performed after NIOSH
8 furnished us more legible data, because the
9 1964 data, a lot of it was blurred and was
10 simply unreadable, so we got the printout.

11 Somehow, somebody at ORAU had
12 managed to manipulate the -- I don't know if
13 they had the microfiche, if they worked
14 directly from the microfiche, but, anyway,
15 they gave me a nice printout, which was, you
16 know, a little bit of a struggle, but with a
17 magnifying glass and looking at it carefully,
18 all the pertinent data was there.

19 CHAIR ZIEMER: Now, let me ask this
20 question before you proceed. We have the
21 original white paper from NIOSH, which was
22 prior that. In fact, we had that at the time

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1 of our last meeting, and then did NIOSH get
2 some additional printouts that were subsequent
3 to that from Landauer that were more clear, or
4 did you have all the legible ones at that
5 time? I'm a little fuzzy as to whether there
6 were some additional reports which you had to
7 go without initially.

8 MR. ALLEN: No, the only thing we
9 received from Landauer was a box of paper. It
10 was their printouts from the microfiche, and
11 that is -- we scanned those, put them on the
12 database for easy --

13 CHAIR ZIEMER: Right.

14 MR. ALLEN: -- to distribute that
15 easily, but, you know, a scan of a printout of
16 a microfiche, it just --

17 CHAIR ZIEMER: But what you had for
18 your analysis is -- that's what you have.

19 MR. ALLEN: Right.

20 CHAIR ZIEMER: So you got some
21 better copies.

22 DR. ANIGSTEIN: Yes. What I got,

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1 basically, must have been then copies.

2 CHAIR ZIEMER: Better copies.

3 DR. ANIGSTEIN: You know, like well
4 produced copies of those, rather than the
5 scanned microfiche on, you know, on a CD,
6 which then I had to print out myself, and some
7 of it was not legible.

8 CHAIR ZIEMER: Okay, but you --
9 NIOSH doesn't have any additional readings
10 that go into the mix.

11 MR. ALLEN: We got a box --

12 CHAIR ZIEMER: Yes.

13 MR. ALLEN: -- one day from them.

14 CHAIR ZIEMER: Right.

15 MR. ALLEN: And then it's a matter
16 of trying to get that into a form that's more
17 readable.

18 CHAIR ZIEMER: And it appeared to
19 me initially that Dr. McKeel thought that he
20 may have had some additional values or
21 individuals or readings --

22 DR. ANIGSTEIN: I believe --

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1 CHAIR ZIEMER: -- that were outside
2 of that time frame or were other people, but
3 you can speak to that.

4 DR. ANIGSTEIN: I believe, yes, I
5 can speak to that.

6 CHAIR ZIEMER: Okay.

7 DR. ANIGSTEIN: Okay.

8 CHAIR ZIEMER: So why don't you
9 proceed?

10 DR. ANIGSTEIN: From the latest
11 correspondence, what Dr. McKeel got from
12 Landauer was, since he didn't want to ask them
13 for the entire older records, because it would
14 have been costly for one thing, so what he got
15 was the -- My impression was that what he got
16 was the final week, the final report for each
17 year, for each calendar year, starting with
18 1963, which happened to be something not
19 included in the data that were furnished from
20 NIOSH, that particular one, and then he got
21 the reports for every year for the end of the
22 year.

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1 And so part of the disconnect was
2 there were different numbers of workers,
3 because what we did, what NIOSH did, and I
4 confirmed, and we came out with the same
5 number. I think it's very similar. It looked
6 like one worker in one case, which I know why
7 there was a difference.

8 We went through week by week, and
9 some workers -- now they issued the film
10 badges to the workers that needed them, so the
11 workers that are working in the betatron, the
12 workers that are working with the cobalt-60
13 sources will be issued badges while they were
14 doing that.

15 Then they might leave. They might
16 take a vacation. They might be reassigned.
17 More likely they were reassigned to other
18 duties, which did not involve, you know,
19 radiation exposure, at least in their
20 definition.

21 CHAIR ZIEMER: At least not
22 directly.

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1 DR. ANIGSTEIN: So they didn't get
2 the badges. So when you go through, people
3 come in to the badge program. They drop out
4 of the badge program. You know, no one else
5 asks for it, but, you know, the Excel
6 spreadsheet I prepared shows that, which I
7 sent you a copy.

8 So during the covered period,
9 during the overlap between the covered period
10 and the film badge records, which is from
11 January 6 -- actually, the first one is
12 January 1 -- 1964 through middle of 1966,
13 there were 88 individuals that were monitored.

14 There were actually 89, but one of
15 them seemed to be the same name. For some
16 reason or other, he had two film badges for a
17 short period of time. I think it was the same
18 person. If there were two different people
19 with the same last name, they would have given
20 their initials to differentiate them.

21 And then NIOSH counted 108, because
22 they were going for the entire period of the

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1 film badges, which is, I believe, through
2 1973, which is essentially when the facility
3 shut down, whereas Dr. McKeel looked at the
4 year-end, at any particular time there were
5 only 30 on that particular week, which is
6 typical. Some weeks were a more, but, anyway,
7 that's typical of what there would be, anyway,
8 so I think that discrepancy has been resolved.

9 DR. MCKEEL: Dr. Anigstein, may I
10 break in, please? This is Dan McKeel.

11 CHAIR ZIEMER: Oh, yes, Dan.

12 DR. ANIGSTEIN: Oh, hi, Dan.

13 CHAIR ZIEMER: We were just
14 wondering if you were on. Good.

15 DR. MCKEEL: The last time, Dr.
16 Ziemer, that you asked if I was on, I was in
17 my same mode, mute off, speaker off, and I
18 spoke as loudly as possible, and you all
19 apparently couldn't hear me.

20 CHAIR ZIEMER: We could not hear a
21 thing.

22 DR. MCKEEL: Well, I'm very --

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1 CHAIR ZIEMER: That's all right.

2 DR. MCKEEL: Okay.

3 CHAIR ZIEMER: Now we hear you very
4 well now.

5 DR. MCKEEL: Now I have. I have
6 been listening all morning and all this
7 afternoon --

8 CHAIR ZIEMER: Good.

9 DR. MCKEEL: -- except I redialed
10 back in. Dr. Anigstein has it essentially
11 correct except for a couple of things. What -
12 - he is correct. Landauer sent me the year-
13 end reports, and the first report I have,
14 actually, is the January 1964 one, even though
15 the badges are listed as being -- the reading
16 was in November 23, 1963, so that part is
17 correct.

18 When I actually counted up all the
19 names on the reports that I have for the year-
20 end, there are 52 names on there, and, as I
21 said, the 1964 data that I got from Landauer
22 is very fuzzy and difficult to read, so I'm

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1 not positive about all the names on there, but
2 I came up with at least 52 different names,
3 and my data was through the closure of the
4 plant in 1973, what they sent me.

5 So I think that does sort of
6 clarify why there is a difference in the
7 number of badge reports that we have, and I
8 still don't understand at all how it is that
9 NIOSH got clear data for 1964. I sent the
10 Board and SC&A and NIOSH my letter from
11 Landauer stating that their data from 1964 was
12 quite fuzzy and difficult to read.

13 Now, again, they may have been
14 referring to just the year-end reports, and
15 other 1964 data was quite clear. I just don't
16 know, but --

17 CHAIR ZIEMER: Bob, can you speak
18 to that?

19 DR. ANIGSTEIN: Yes, I agree. It
20 was fuzzy. It was difficult to read, but it
21 was nevertheless legible. If you spent enough
22 time with it with a magnifying glass, you

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1 could make out each name, and if you, for
2 instance if the name is a little fuzzy on one
3 report, you can make out the badge number, and
4 you look to another report and you see what
5 name, but they never changed badge numbers.

6 So by comparing week after week,
7 there was not a single data gap that couldn't
8 be filled in. As I said, it was not an easy
9 job, but I can stand firmly behind the fact
10 that we were able to interpret each week's
11 report.

12 DR. MCKEEL: And then, Dr.
13 Anigstein, would you also please comment? I
14 was quite surprised in your latest report,
15 which I got yesterday, that it mentions in
16 there correspondence that SC&A had with
17 Landauer, and it would help me at least to
18 know. So you got data independently from
19 Landauer --

20 DR. ANIGSTEIN: No.

21 DR. MCKEEL: -- and then
22 corresponded with them?

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1 DR. ANIGSTEIN: No, let me -- one
2 second. Let me see what you are referring.
3 Give me one moment, please. The latest report
4 --

5 DR. MCKEEL: You say -- in this
6 latest report you say, "Each of the dose
7 subtractions" --

8 DR. ANIGSTEIN: Oh, yes.

9 DR. MCKEEL: -- "was made by
10 Landauer following requests from TSI.
11 According to copies of correspondence
12 furnished by Landauer" --

13 DR. ANIGSTEIN: That is correct.

14 DR. MCKEEL: -- "to SC&A."

15 DR. ANIGSTEIN: Okay. That is
16 correct. We have a person on our staff who is
17 a SC&A associate, which means one of our
18 outside consultants, who happened to have a
19 personal connection at Landauer, because he is
20 retired former vice president of Landauer.

21 So I asked him for an explanation
22 where there was on one of the -- on two of the

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1 reports, there would be a high dose, and in
2 public I can't really speak to what the dose
3 was, but, anyway, a very high dose.

4 DR. MCKEEL: Why can you not name a
5 high dose in public --?

6 DR. ANIGSTEIN: Well, again, I --

7 DR. MCKEEL: -- so there they
8 named?

9 DR. ANIGSTEIN: There's an OGC
10 lawyer here who won't allow me to make --

11 CHAIR ZIEMER: Can he mention the
12 dose?

13 DR. ANIGSTEIN: Pardon?

14 CHAIR ZIEMER: The dose number?

15 DR. ANIGSTEIN: It was not a real
16 number. It was an -- it was --

17 MS. HOWELL: That's fine.

18 DR. ANIGSTEIN: Pardon?

19 MS. HOWELL: That's fine.

20 CHAIR ZIEMER: The amount of dose.

21 DR. ANIGSTEIN: The dose, there was
22 a dose of -- there was a recorded dose of

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1 38,500 millirem in one case and 19,000 in
2 another case, and so this was -- I was able to
3 trace back and find the weekly, you know,
4 thumbing through the weekly reports.

5 First of all, I preface it with
6 saying it was not during the covered period.
7 It was during the residual period, so it was -
8 - one was in 1969, one was in 1970. So that
9 was -- so the initial review I had made, I
10 only covered the period of AEC operations
11 through, you know, middle of 1964 -- 1966.

12 Okay, now, following the report for
13 that week, so, you know, you have the dates,
14 the beginning and end dates for that weekly
15 badge, and then at the top there is a
16 processing date, which is typically two, three
17 weeks later, when the report is actually
18 printed.

19 The next page in the sequence is a
20 badge report for just that one individual, the
21 same format, but only the one individual is
22 listed. The processing date was a couple of

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1 months later. Like in one case the report was
2 for the date in November, and then the next
3 one was the following -- a new report for the
4 same individual but for the same weekly
5 exposure period, but the date of the report
6 was in February, if I remember correctly, and
7 there was a notation alongside it, DS. Again,
8 it said 38,500 millirem but a notation DS.

9 Not having any idea of what that
10 meant, I called our consultant, Joseph
11 Zlotnicki, and I said, "Do you happen to know
12 what DS means?" He said, "Certainly. DS
13 means dose subtracted, so basically I go with
14 like a negative dose," and then, indeed, later
15 reports for that same individual showed his
16 cumulative dose M, minimal.

17 So then I was speaking to Mr. -- is
18 he a doctor, Mr. --

19 DR. MAURO: Doctor.

20 DR. ANIGSTEIN: Dr. Zlotnicki. I
21 said, "Do we have any information on it? Do
22 you have any?" He says, "Yes, chances are

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1 that Landauer would have had documentation on
2 that," and using his -- you know, this is like
3 informal.

4 Nobody paid for this. He just --
5 people there, you know, whom he knew doing him
6 a favor, and they sent him a, again, a scanned
7 printout of a letter, which he then passed on
8 to me, and in the first case it was a letter
9 from the radiation officer at GSI and a letter
10 to Landauer, and it's mentioned in my report,
11 and then attached to it was a little memo from
12 a worker saying, "I wore So-and-So's badge on
13 this particular week, and then I accidentally
14 left it in the shooting -- dropped it and left
15 it in the shooting room," so that explains the
16 exposure, and --

17 DR. MCKEEL: Well, no, that's one
18 possibility.

19 DR. ANIGSTEIN: Excuse me. It's
20 documented. It's documented. That person
21 wrote a note to his supervisor saying, "I wore
22 Mr. X's badge, and I left it, and I

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1 accidentally dropped it in the shooting room,"
2 and this letter was sent to Landauer, and
3 Landauer removed that exposure from his
4 record, and --

5 DR. MCKEEL: Just for the record,
6 this is a report that you got from a former
7 Landauer employer, not an employee, not a
8 Landauer employee now.

9 DR. ANIGSTEIN: This report was
10 furnished -- well, up the chain.

11 DR. MCKEEL: He worked for SC&A.

12 DR. ANIGSTEIN: Okay, that was the
13 chain of custody, but the letter itself has,
14 which I have in front of me, but I can't --
15 you know, I'm not at liberty to share it. The
16 letter itself has -- is on -- basically, the
17 letter is from GSI to Landauer.

18 CHAIR ZIEMER: On GSI letterhead.

19 DR. ANIGSTEIN: I believe so.

20 CHAIR ZIEMER: Well, while you're
21 looking for that --

22 DR. ANIGSTEIN: There is a

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1 signature. It's a GSI letterhead. It's
2 dated. It's signed, and, again, I don't wish
3 to speak his name, but it's a name that we
4 have come across as a supervisor and radiation
5 officer in Landauer, and, as a matter of fact,
6 the film badge reports are addressed to him.
7 He was the one who collected the report, who
8 was --

9 DR. MCKEEL: Yes, I understand
10 that. My question is that letter --

11 DR. ANIGSTEIN: So the authenticity
12 --

13 DR. MCKEEL: Has that letter been
14 transmitted to the Board and to NIOSH?

15 DR. ANIGSTEIN: No, it hasn't.

16 DR. MCKEEL: Well, should it not
17 be?

18 DR. ANIGSTEIN: We just got it, but
19 yes. The point is accepted. That's an
20 internal matter here, but it's --

21 DR. MCKEEL: And can it be -- and
22 can it be sent to me, as well?

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1 DR. ANIGSTEIN: No, we cannot
2 release it, because it's, again, Privacy Act.

3 DR. MCKEEL: I object strongly, and
4 I request that letter after Privacy Act
5 redaction.

6 DR. ANIGSTEIN: Okay.

7 MS. HOWELL: Can it be released
8 after it's redacted?

9 MR. KATZ: Dan, absolutely, you can
10 get it with Privacy Act redactions.

11 DR. MCKEEL: Okay.

12 DR. ANIGSTEIN: And the second --
13 and the second instance was --

14 CHAIR ZIEMER: There would be two
15 letters, actually, right?

16 DR. ANIGSTEIN: Yes.

17 CHAIR ZIEMER: Is there -- there's
18 one --

19 DR. ANIGSTEIN: One is two pages,
20 which is the --

21 CHAIR ZIEMER: One is from --

22 DR. ANIGSTEIN: One is from the

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1 supervisor to General Steel, to Landauer with
2 an attachment, which is a memo from the worker
3 to the supervisor. Okay.

4 Then the second letter was written,
5 in the case of another worker, was written
6 directly by the worker, who simply -- it's not
7 on a letterhead. It simply had a -- it's
8 simply headed.

9 Granted, somebody obviously typed
10 this for him, or he typed it himself. It
11 simply said Granite City, Illinois, with a
12 date, and it's addressed to R. S. Landauer,
13 Jr. and Company, and it says that he
14 accidentally lost his film badge.

15 It says, "My film badge -- sometime
16 during the evening of, my film badge was --."

17 I quoted that in the report, I think, "-- was
18 accidentally lost in the exposure room of the
19 GSI betatron. The badge was not found until
20 Monday morning," leaving on Friday.

21 And then he goes on to say that
22 that week he worked with other workers, and he

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1 lists their names and their badge numbers and
2 says that he was always with one of those men
3 in the radiation area and since none of their
4 film badges showed any readings, you know,
5 above minimal.

6 Therefore, he is saying he
7 therefore uses that as evidence that he also
8 did not get any exposure and says that -- and
9 he concludes by saying, "Since their badges
10 showed no exposure, I am sure that the
11 exposure shown on my badge is due to being
12 accidentally lost in the radiation area."

13 DR. MCKEEL: Do we know if that
14 worker that signed that letter is alive or
15 dead?

16 DR. ANIGSTEIN: I don't -- I do not
17 know that.

18 DR. MCKEEL: Well, that's a very
19 important thing, because if that worker is
20 dead --

21 DR. ANIGSTEIN: Because I have no
22 way of --

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1 DR. MCKEEL: -- the Privacy Act
2 does not apply to him.

3 DR. ANIGSTEIN: Right. I have no
4 way of finding that out.

5 DR. MCKEEL: Well, I mean, is it a
6 worker that's known to you through your
7 satellite --

8 DR. ANIGSTEIN: No, it's not --
9 it's not any of the workers that attended
10 meetings or --

11 DR. MCKEEL: Well, if there is some
12 way that you can privately or the Board can
13 privately interact with some of the living,
14 active betatron workers that are working with
15 us now, I'm sure they can confirm whether or
16 not that gentleman is alive or dead.

17 MEMBER BEACH: Bob, that says in
18 your statement that occurrences are consistent
19 with statements made by two former GSI
20 operators at the August 22 meeting.

21 DR. ANIGSTEIN: They're not the
22 same ones, though.

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1 MEMBER BEACH: They're not the
2 same?

3 DR. ANIGSTEIN: No, they're not the
4 same. That is simply the two operators where
5 Dr. McKeel was there, because I think he had
6 organized the meeting, who simply stated --
7 interestingly enough, both these occurrences -
8 - in one case that it was not uncommon, or, at
9 least, it had been done, that somebody would
10 take another worker's badge and deliberately
11 expose it as a way of getting that worker
12 canned.

13 There was an expletive that I
14 deleted, and in the other case, another
15 current betatron operator, I mean, currently
16 living betatron operator said also sometimes
17 they would deliberately leave their own badge
18 in and expose it just to see if anybody picked
19 up the readings, and so here were two cases.

20 MEMBER BEACH: Because of their
21 failure to trust dose rates.

22 DR. ANIGSTEIN: Exactly.

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1 MEMBER BEACH: Right. Okay.

2 DR. ANIGSTEIN: And so here were
3 two cases, documented, where exactly that
4 happened, one of each.

5 MS. HOMOKI-TITUS: I'm sorry. This
6 is Liz Homoki-Titus. I don't mean to
7 interrupt, but I don't want to leave an
8 incorrect statement floating out there. Dr.
9 McKeel is correct that when someone passes
10 away they no longer have a privacy interest,
11 but there may be other interests in that
12 letter, so just because the person may be
13 deceased does not necessarily mean that we
14 will release the name or personal information.

15 DR. ANIGSTEIN: Yes, I understand
16 that. That was said during our last meeting.

17 MS. HOMOKI-TITUS: I just wanted to
18 clarify for the Board and have it on the
19 record.

20 DR. ANIGSTEIN: Yes.

21 CHAIR ZIEMER: Thanks, Liz.

22 MR. RAMSPOTT: Dr. Ziemer, this is

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1 John Ramspott. May I ask Bob a question?

2 CHAIR ZIEMER: Yes.

3 MR. RAMSPOTT: Bob, did you -- did
4 I understand you correctly to say the first
5 individual that is being discussed now,
6 according to that official document and
7 letter, was wearing someone else's badge?

8 DR. ANIGSTEIN: No, the other way
9 around. The individual whose badge -- the
10 badge report comes back with the badge number
11 and the name of the worker that badge number
12 was assigned to, and the badge number, once
13 it's assigned, it's forever.

14 If that worker goes away or dies,
15 that badge number is retired. It's never used
16 for anyone else at that same facility, of
17 course, the same numbers for the facilities.
18 So worker -- the badge number, the badge for
19 Worker X, came back with this very high
20 reading.

21 MR. RAMSPOTT: Okay.

22 DR. ANIGSTEIN: So apparently what

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1 happened then, there must have been some kind
2 of an internal -- I mean, I'm just -- now I'm
3 just extrapolating, but the first thing we
4 know, the supervisor sends a letter to
5 Landauer with an attached memo written to him,
6 so a worker whose name I never saw, and, by
7 the way, his name does not appear on any of
8 the badge records that I could find, that I
9 saw, so it's a new -- it's a new name.

10 MR. RAMSPOTT: Okay.

11 DR. ANIGSTEIN: Simply wrote a
12 letter to his supervisor saying, "On that
13 particular week, I picked up Worker X's badge
14 by mistake."

15 MR. RAMSPOTT: That's what I have.

16 CHAIR ZIEMER: "And then I left it,
17 and it fell off my pocket," or something like
18 that, and it fell into the betatron room and
19 was left there during exposures.

20 CHAIR ZIEMER: But he never had a
21 badge?

22 MR. RAMSPOTT: Did I miss

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1 something? Doesn't it sound like --?

2 DR. ANIGSTEIN: I'm just saying --

3 CHAIR ZIEMER: But you're saying
4 that worker never had a badge of his own.

5 MR. RAMSPOTT: That's what I'm
6 saying.

7 DR. ANIGSTEIN: As far as I can
8 tell from all -- you know, this is in the
9 period, in the later period, so I didn't look
10 at each and every week.

11 MR. RAMSPOTT: I guess what I'm
12 questioning is did --

13 DR. ANIGSTEIN: I did -- I did -- I
14 did during the covered period, but I did, you
15 know, skim through, and I thought, "Well,
16 let's see. Did he have a badge a previous
17 week, two weeks before, three weeks before,
18 one week after, two weeks after?"

19 I just randomly looked at other
20 reports during that year. I never saw his
21 name. That's all I can say. I can't say that
22 it -- I did not look at every one of the, you

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1 know, 400 or 500 pages of reports for the
2 later period to see whether his name appeared
3 or not.

4 MR. RAMSPOTT: I guess what I'm
5 saying is that individual or that letter that
6 you have there --

7 DR. ANIGSTEIN: Yes.

8 MR. RAMSPOTT: Doesn't it -- did it
9 not come from an individual saying he had
10 somebody else's badge on?

11 DR. ANIGSTEIN: That is correct.

12 MR. RAMSPOTT: That's what I
13 thought.

14 DR. ANIGSTEIN: But I'm saying the
15 man who signed the letter, I did not find his
16 name on any badge reports.

17 MR. RAMSPOTT: I guess what I'm
18 concerned about is --

19 DR. ANIGSTEIN: The one, oh, the
20 report of whose badge he wore, definitely.

21 MR. RAMSPOTT: Well, I'm more
22 concerned about --

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1 DR. ANIGSTEIN: That was the one
2 with the very high reading.

3 MR. RAMSPOTT: -- being able to
4 identify the correct person to the correct
5 badge.

6 DR. ANIGSTEIN: Okay.

7 MR. RAMSPOTT: I mean, that would
8 be pretty --

9 DR. ANIGSTEIN: Let me - again, I'm
10 going to make up a name now. Remember, it's a
11 made-up name. I'm going to say here it is,
12 memo to Mr. Supervisor.

13 MR. RAMSPOTT: Okay.

14 DR. ANIGSTEIN: Subject, film badge
15 exposure. "While working the week of 10/6/69,
16 I wore Mr. Smith's film badge by mistake, of
17 M. Smith's film badge by mistake. The badge
18 fell off in the shooting room and was
19 exposed."

20 MR. RAMSPOTT: "I wore somebody
21 else's badge by mistake" is the point I wanted
22 to make.

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1 DR. ANIGSTEIN: Yes, exactly, and
2 he gave the name.

3 MR. RAMSPOTT: So he did wear
4 somebody else's badge.

5 DR. ANIGSTEIN: That is what he
6 says.

7 MR. RAMSPOTT: Okay. That's what I
8 thought I heard.

9 DR. ANIGSTEIN: Yes, that's what he
10 said, and then --

11 MR. RAMSPOTT: That's pretty
12 important.

13 DR. ANIGSTEIN: This was attached
14 to the letter from the supervisor to Landauer,
15 saying, "Attached is a copy of a letter
16 explaining the exposure of Mr. Smith's film
17 badge during the week of October 6, 1969.
18 Please correct your records to show Mr.
19 Smith's annual exposure with consideration
20 being given to this letter."

21 MR. RAMSPOTT: Yes, well, that's, I
22 guess, the accuracy of who wore what badge,

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1 when, the right person. That's my main point.

2 I'm not questioning that letter. That letter
3 is actually very helpful. If we ever get a
4 copy of it, it shows that the badges were a
5 little loose.

6 DR. ANIGSTEIN: Well, it shows that
7 during the meeting -- I mean, it simply
8 confirms the statement made by a person, and
9 I'm sure you will remember his name. I can't
10 say it here -- during the meeting where, John,
11 you and Dr. McKeel -- it was the -- I believe
12 it was the August 21, 2006 meeting, outreach
13 meeting where NIOSH was present. Mr. Allen,
14 David Allen, and Stuart Hinnefeld were there.

15 The statement was made. Somebody
16 would take -- you know, you guys all -- if I
17 read correctly the statement he -- actually, I
18 have his statement. I can read it for you.

19 CHAIR ZIEMER: Well, that's all
20 right.

21 DR. ANIGSTEIN: But he says, you
22 know, you guys will all remember, "There was

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1 somebody we didn't like, we didn't care to
2 work with, we would expose their badge."

3 MR. RAMSPOTT: But that's different
4 than not having the right badge.

5 DR. ANIGSTEIN: If I can just put
6 it in my personal opinion, I don't think this
7 worker is going to say, "I deliberately took
8 his badge and left it there," so it's a very
9 convenient way of saying, "Well, I
10 accidentally wore his badge, and I
11 accidentally dropped it."

12 MR. RAMSPOTT: Well, that's all
13 hypothetical.

14 DR. ANIGSTEIN: It's a lot of
15 accidents.

16 CHAIR ZIEMER: Well, okay --

17 MR. RAMSPOTT: Okay. I just wanted
18 to make sure I heard that right.

19 CHAIR ZIEMER: Sure. Okay. Okay,
20 so, Bob, as far as you know, you now have a
21 record of all the film badge exposures. What
22 further -- what's the bottom line on all of

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1 this?

2 DR. MCKEEL: May I please
3 interrupt?

4 CHAIR ZIEMER: Yes.

5 DR. MCKEEL: Are you all going to
6 forget the information I just sent to Dr.
7 Anigstein about the additional worker who
8 provided us with another second set of --
9 another film badge report --

10 DR. ANIGSTEIN: Yes.

11 DR. MCKEEL: -- from another pool?

12 DR. ANIGSTEIN: I will be getting
13 that. I will be getting to that.

14 DR. MCKEEL: Oh, okay.

15 DR. ANIGSTEIN: Yes, we won't -- so
16 the additional information that Dr. McKeel
17 submitted, again I will just, you know, give
18 the worker a pseudonym so it will be easier to
19 talk about. Let me see it here.

20 Okay. The first page was
21 apparently transmitted by fax to, I assume, to
22 Dr. McKeel. There is a little tag heading at

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1 the bottom. It's headed, "Atomic Energy
2 Commission, U.S. Atomic Energy Commission.
3 Occupational External Radiation Exposure
4 History," and in the upper left-hand corner,
5 barely legible but legible, it says, "Form AEC
6 4," and then a date, you know, month and year,
7 I guess, when the form was adopted, and for
8 those in the health physics community, you'll
9 know this is essentially the same as the
10 current NRC Form 4.

11 And the purpose of this form is to
12 allow a worker going from one job to another
13 to carry his exposure history, and the
14 importance of that in those days was that the
15 exposure, radiation exposure, was based on the
16 assumption that the worker could receive up to
17 5 rem a year for every year past the age of
18 18.

19 So if he was under 18, he wasn't
20 allowed to work in a radiation, you know,
21 facility. So if he was 19, you could say,
22 "Okay, he was allowed 5 rem for the previous

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1 year that he was not exposed," and then you
2 subtract from that any actual exposure, and
3 that's the logic behind it.

4 So, on this form -- so the fact
5 that it has the heading of Atomic Energy
6 Commission simply means it's their form, just
7 like you do -- your income taxes will have,
8 you know, Internal Revenue Service on the top.

9 That doesn't mean the Atomic Energy
10 Commission prepared the form. I mean, they
11 simply furnished the blank form to be used.

12 And it lists two different -- oh,
13 there is another employer and then General
14 Steel Industries. The other employer seems to
15 be a -- I guess this is Pittsburgh Testing.
16 It seems to be a radiographic facility that
17 did radiographic testing of steel structures.

18 I looked them up on the internet,
19 and they were being sued by U.S. Steel for not
20 having properly examined some steel structure
21 that was then -- that a bridge had to be
22 closed because it was defective, so apparently

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1 they were doing radiography. I mean, I'm just
2 guessing. I mean, it's an informed guess.

3 And then, also, it says that he
4 worked at General Steel Industries for so many
5 quarters, and he got a certain dose, but the
6 basis of the dose was -- simply it just says,
7 "Record." There is -- it doesn't necessarily
8 mean that it was monitored, and then, after
9 that one page, there is a record from 1963 for
10 the same individual.

11 DR. MCKEEL: Excuse me. Oh, excuse
12 me, Bob. That's not really a complete reading
13 of what's on that report at all.

14 DR. ANIGSTEIN: Okay.

15 DR. MCKEEL: It's also not a
16 complete --

17 DR. ANIGSTEIN: Well, I'm --

18 DR. MCKEEL: -- revelation of the
19 fact that that worker is also the recipient
20 and is on my list and, I'm sure, on yours for
21 receiving the R.S. Landauer, Jr. badge reports
22 from `64 on.

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1 DR. ANIGSTEIN: That is correct.

2 DR. MCKEEL: That worker was there
3 for a very long time.

4 DR. ANIGSTEIN: Yes, I will agree
5 with that.

6 DR. MCKEEL: Okay.

7 DR. ANIGSTEIN: I am trying to be
8 as unspecific not to get in trouble with the
9 lawyer.

10 DR. MCKEEL: No, we need to be as
11 specific and accurate as possible.

12 DR. ANIGSTEIN: Well, I'm limited
13 to what I'm allowed to say. Yes, this worker
14 -- I mean, but I haven't finished yet.

15 DR. MCKEEL: Okay.

16 DR. ANIGSTEIN: I simply gave the
17 first page, which is his exposure, his prior
18 exposure history.

19 DR. MCKEEL: You forgot to put the
20 date that that report was. That's extremely
21 important.

22 DR. ANIGSTEIN: I'm asked not to.

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1 DR. MCKEEL: Pre-1962 was the date.

2 DR. ANIGSTEIN: Dr. McKeel, you are
3 at liberty to read that, to read anything you
4 wish from that report. We're constrained.
5 You are not covered by Privacy Act. If you
6 wish to read that in --

7 DR. MCKEEL: You can't even name --
8 give the date of that report?

9 MS. HOWELL: Dr. McKeel, we try to
10 -- this is Emily Howell.

11 DR. MCKEEL: Yes.

12 MS. HOWELL: We're trying to
13 protect people's privacy, and it's not simply
14 their name or their badge number that could
15 identify them, but there are also dates that
16 could and other information for individuals
17 that were there, so Mr. Anigstein is just
18 trying to maintain that information boundary
19 in a respectable way, and certainly the Board
20 members can see this information, so I don't
21 want you to feel that they are in any way
22 being constrained from having all the

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1 information they need to perform their duties.

2 DR. MCKEEL: Yes, but what is
3 happening is that there is being put on the
4 official record information that I think is
5 highly misleading, and I would simply like to
6 respectfully challenge the fact that we're not
7 talking about this gentleman's birth date or
8 any other thing, simply that he signed this
9 report on March [Identifying Information
10 Redacted] of 1962, which is prior to any of
11 the R.S. Landauer reports, and it was a man
12 who had gotten additional reports from
13 Landauer with Landauer at the top of the
14 report form and appears on many Landauer year-
15 end reports.

16 So I just want to indicate that
17 this is apparently for one individual, two
18 sets of radiation monitoring data, and this
19 particular one is so important because it's
20 before any of the badge data that SC&A and
21 NIOSH have discussed thus far, and it's also
22 data that I brought to everyone's attention

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1 back in 2006.

2 So we are discussing something that
3 could have been followed up, should have been
4 followed up, should have been researched
5 thoroughly, and, also, at the bottom of that
6 report that Bob just mentioned is another very
7 important fact, and that is that the apparent
8 source of that is the Nuclear Consultants
9 Corporation, and I sent him some additional
10 information showing that Nuclear Consultants
11 Corporation was later acquired by
12 Mallinckrodt, and what that indicates is that
13 here is badge data from 1962 of a company that
14 eventually was purchased by, acquired by,
15 merged into Mallinckrodt, and it's a strong
16 indication that NIOSH should go back and
17 investigate the Mallinckrodt dosimetry records
18 carefully and make sure that there are no more
19 GSI data.

20 I mean, we have, you know, this one
21 report, but it implies the possibility, at
22 least, that there was data from this same

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1 corporation for years before that and that
2 this is just one surviving record that this
3 gentleman decided to supply to us.

4 CHAIR ZIEMER: Okay. Let me
5 interject here, though, one point, the fact
6 that it was on a Landauer form. The practice
7 --

8 DR. MCKEEL: It wasn't on a
9 Landauer form.

10 DR. ANIGSTEIN: This is the --

11 CHAIR ZIEMER: Oh, which are you
12 talking about?

13 DR. MCKEEL: I'm talking about --

14 DR. ANIGSTEIN: The attachments to
15 Dr. McKeel's email --

16 CHAIR ZIEMER: Oh, yes. Yes.

17 DR. ANIGSTEIN: -- that you should
18 have gotten.

19 CHAIR ZIEMER: Yes.

20 DR. ANIGSTEIN: I have it here. We
21 can --

22 DR. MCKEEL: Well, I know more

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1 people on the Board got that form, because I
2 sent it to everybody.

3 DR. ANIGSTEIN: Everyone has it.

4 CHAIR ZIEMER: Okay, but what were
5 you saying about Landauer on this particular
6 one?

7 DR. MCKEEL: I was saying that this
8 gentleman appears on the Landauer listings for
9 GSI `64[Identifying Information Redacted] to
10 `73[Identifying Information Redacted] on
11 various of those reports that NIOSH, SC&A and
12 myself and the Board, I presume, have all seen
13 by now, so this gentleman is a link between
14 the Landauer data, which we have been
15 discussing, and a previous data set, I
16 believe, of monitoring data at GSI that was
17 compiled by this Nuclear Consultants
18 Corporation on an AEC standard form. And we
19 have a series, actually, of those reports on
20 AEC-4 from the same gentleman for subsequent
21 years, so either, you know, the AEC some way
22 was or another company was using AEC forms.

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1 Now, on the later forms from this
2 same gentleman, interestingly, what's listed
3 at the bottom after the `63 report that I'm
4 talking about -- I mean, the `62 report that
5 I'm talking about, March[Identifying
6 Information Redacted] 1962. The reports,
7 rather than having Nuclear Consultants
8 Corporation at the bottom, what I call the
9 footer, they have the Commonwealth Division of
10 General Steel Industries at the bottom, so
11 there again there is some indication that even
12 though this is an AEC-4 form, it's completely
13 different or quite different from the R.S.
14 Landauer form, or at least the year-end report
15 that I got.

16 There are two different groups
17 noted on the bottom of that form, Nuclear
18 Consultants Corporation for 1962, and 1964
19 through 1969 is Commonwealth Division of
20 General Steel Industries. Anyway, so, sorry
21 to interrupt, but I think it's very important
22 to get that accurate picture on the record.

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1 CHAIR ZIEMER: Yes, and this AEC
2 form would have been used by all licensees. I
3 mean, we used them at Purdue. They would
4 appear on everybody's records, and they were
5 prepared by the film badge users and, upon
6 request, the record from previous uses could
7 be provided to your current film badge user,
8 in this case Landauer, so that they would
9 carry it forward, because they calculated the
10 5(N-18) value that Bob referred to earlier.

11 So the preferable thing is, if
12 there was previous exposure with a different
13 film badge vendor, would be to supply Landauer
14 with the AEC form information so that it would
15 be incorporated into the Landauer records as a
16 new base point for a new worker.

17 I just want to make sure everybody
18 understands that there is a link -- there
19 should always be a linkage for people who
20 worked in earlier time periods at other
21 places. They should -- they didn't always do
22 it, but they should have linked their previous

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1 exposure through their current film badge
2 supplier.

3 So if the person came from -- where
4 was that before -- and filled out this form,
5 which was a requirement, because you were
6 supposed to determine their previous exposure
7 history and calculate 5(N-18) to determine if
8 they were even eligible for exposure, and then
9 presumably you would provide that to the
10 supplier.

11 DR. MCKEEL: Well, Paul, I agree
12 with all of that. I'm sure you're correct,
13 but this particular individual we know started
14 working at GSI in 1953[Identifying Information
15 Redacted], and this report wasn't until
16 March[Identifying Information Redacted] of
17 1962, and what's interesting is we -- and I
18 say we collectively -- as far as I'm aware,
19 have no other AEC form for reports for any GSI
20 worker other than one other person who
21 supplied us with some from a later time
22 period.

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1 So, you know, either all of those
2 reports are missing, which seems possible --
3 you have to remember that for 2005 and 2006,
4 NIOSH said they had no badge data at all on
5 GSI workers, so, you know, I just think there
6 needs to be intensive additional
7 investigation, including the linkages that you
8 mentioned back to, you know, those older
9 records, wherever they reside at the NRC now
10 or at Department of Energy.

11 I'm not sure. You all would know
12 better than I, but the -- we need to find out
13 whether there are more film badges from
14 1953[Identifying Information Redacted] to
15 1963, and then I also mention that this same
16 worker, in another page that I sent to you
17 all, has data from 1963 where there are four
18 individual quarterly reports.

19 So this worker, who we know was
20 there after 1964 forward and has Landauer
21 listings, also has at least four readings
22 during 1963, and we believe that the Landauer

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1 badge program began probably in November `63
2 at the earliest, and we know that that same
3 worker had information from -- had monitoring
4 information from the year before, and we know
5 that that same individual worked at GSI since
6 1953[Identifying Information Redacted].

7 So, somehow a coherent picture of
8 all that has to be fitted into place and
9 juxtaposed, I believe, with the information
10 that we haven't discussed that I put on the
11 record when I presented my -- our response to
12 the SEC evaluation report at the February
13 Board meeting.

14 At IAPP they had concluded that
15 badge data for those radiographers from a
16 later time period could not be extrapolated
17 back to the covered period at -- they had
18 badge data from 1955, but NIOSH concluded it
19 could not extrapolate back to the year of the
20 IAP radiographers SEC, which I think was `47
21 to `48.

22 So all that needs to be kind of put

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1 together and considered when you all make a
2 final recommendation about where you judge all
3 of this badge data, and I guess the other
4 related thing that I have to say is that, as
5 far as I'm concerned, the NIOSH reports that
6 everything was going to be resolved by looking
7 at the film badge data, including your point
8 that the sources had not been looked at, all
9 the sources had not been looked at, I just
10 don't believe that's an adequate response to
11 this.

12 I don't think these badges are
13 going to solve all those questions. I'm not
14 questioning that we need to explore the badge
15 data in detail, but we can't simply overlook
16 all of the uncertainties that are not
17 addressed for Appendix BB and for the white
18 paper that I mentioned to you all on February
19 18.

20 CHAIR ZIEMER: Okay, yes, thanks,
21 and I don't think we're at the point of saying
22 that the film badges are going to solve all

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1 this. In fact, we are trying to assess their
2 value, so we're mindful of your comments, Dan.

3 We appreciate that.

4 MR. RAMSPOTT: Dr. Ziemer, this is
5 John Ramspott. May I comment?

6 CHAIR ZIEMER: You bet.

7 MR. RAMSPOTT: And, again, Dr.
8 Anigstein, the reports you have that are from
9 Dr. McKeel --

10 DR. ANIGSTEIN: Yes.

11 MR. RAMSPOTT: -- does it not show
12 previous quarters?

13 DR. ANIGSTEIN: I'm not sure.
14 Could you state your --

15 MR. RAMSPOTT: On these reports --

16 DR. ANIGSTEIN: Yes.

17 MR. RAMSPOTT: -- they show
18 previous quarters.

19 DR. ANIGSTEIN: The reports,
20 perhaps you -- okay, the report for the worker
21 in question shows two quarters of employment
22 at another employer.

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1 MR. RAMSPOTT: Okay.

2 DR. ANIGSTEIN: And there was no --
3 there was no record of exposure, so under the
4 explanation of the dose, it said calculated at
5 3.75 rem per quarter. There is no basis. We
6 don't know why they chose that number. That
7 was something that was --

8 MR. RAMSPOTT: Does it show his
9 employment history?

10 DR. ANIGSTEIN: Yes, it showed his
11 employment history.

12 MR. RAMSPOTT: May I ask what --

13 DR. ANIGSTEIN: Again, McKeel can
14 share that with you. I cannot do it on the
15 phone.

16 MR. RAMSPOTT: Okay, what I'm
17 getting at, I thought it showed the number of
18 quarters.

19 DR. ANIGSTEIN: That is correct,
20 and the second line shows the number of
21 quarters employed at GSI.

22 MR. RAMSPOTT: And how many

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1 quarters is that?

2 DR. ANIGSTEIN: Okay, 18 quarters.

3 CHAIR ZIEMER: Well, I can tell you
4 what they did.

5 DR. ANIGSTEIN: Okay.

6 MR. RAMSPOTT: Oh, good.

7 CHAIR ZIEMER: Just looking at the
8 numbers.

9 DR. ANIGSTEIN: Yes.

10 CHAIR ZIEMER: The old annual dose
11 limits were 15 rem per year.

12 DR. ANIGSTEIN: Oh, there was --
13 there was a time?

14 CHAIR ZIEMER: Oh, yes.

15 DR. ANIGSTEIN: I didn't know that.

16 CHAIR ZIEMER: 3.75 per quarter.

17 DR. ANIGSTEIN: Got it.

18 CHAIR ZIEMER: And he worked there
19 at that facility for two quarters I think it
20 shows.

21 DR. ANIGSTEIN: Okay, thank you for
22 telling me that.

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1 CHAIR ZIEMER: They assigned him,
2 apparently -- in the absence of dosimetry
3 data, they apparently assigned him the maximum
4 allowable dose for that facility.

5 DR. ANIGSTEIN: Got it.

6 MEMBER POSTON: Which was the law
7 at the time. If you don't know the dose, you
8 give them the maximum.

9 CHAIR ZIEMER: Yes.

10 MR. RAMSPOTT: That's what I was
11 getting at, 18 quarters --

12 CHAIR ZIEMER: No, no. The first
13 two quarters are done that way.

14 MR. RAMSPOTT: Okay, and then the
15 18 quarters?

16 CHAIR ZIEMER: Then it shows --
17 then he's at -- there's actual records then,
18 according --

19 MR. RAMSPOTT: That's my point.

20 CHAIR ZIEMER: Yes, when I look --

21 MR. RAMSPOTT: There are records
22 going back 18 quarters prior to this 1962

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1 date, which means this man has records going
2 way back with somebody, but, I mean, just tell
3 me if I'm right or wrong.

4 CHAIR ZIEMER: Well, all we know --

5 MR. RAMSPOTT: We've got 18
6 quarters.

7 DR. ANIGSTEIN: -- is that it says
8 -- it gives a starting date, and --

9 MR. RAMSPOTT: Yes. The starting
10 date was the `53[Identifying Information
11 Redacted].

12 DR. ANIGSTEIN: Correct.

13 MR. RAMSPOTT: There are records
14 going way back on this guy somewhere. Then I
15 guess the other question I had --

16 DR. ANIGSTEIN: The quarters were
17 not -- in other words, there's nine years from
18 the starting date to the date of the -- that
19 this was signed, and yet there are only 18
20 quarters, so there was like --

21 MR. RAMSPOTT: Well, I understand
22 they only go back so far.

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1 DR. ANIGSTEIN: You have to go to -
2 -

3 MR. RAMSPOTT: If I thought I -- I
4 mean, I think I heard that, but I'm not
5 positive about that part, but we do know there
6 should be 18 quarters.

7 CHAIR ZIEMER: There's 36 quarters
8 in the period of interest.

9 DR. ANIGSTEIN: Right, exactly.

10 CHAIR ZIEMER: So they are
11 reporting on 18 of them.

12 MR. RAMSPOTT: Yes, so I guess what
13 that means is there's time prior to this
14 report somewhere. If these guys have the
15 records, they got them from somewhere, and I
16 would assume they got them from the 18
17 quarters prior to this date. That definitely
18 proves there were records.

19 CHAIR ZIEMER: That's what it
20 appears.

21 MR. RAMSPOTT: But then the other
22 point I'd like to make, this other report that

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1 Dr. McKeel referred to, it would be real
2 interesting, and wouldn't there be two sets of
3 records running at the same time? It would be
4 interesting to know if this other individual
5 that we know had an AEC report also had a
6 Landauer report for the same times. I'd be
7 kind of interested. If they don't get added
8 together that could be a real mess.

9 CHAIR ZIEMER: Well, they wouldn't
10 add them together, but most places were
11 responsible to keep their own AEC reports.

12 MR. RAMSPOTT: Okay.

13 CHAIR ZIEMER: And then when the
14 person went to their next job, you would take
15 -- you would basically give them an update,
16 which was the old AEC report plus anything
17 they got when they worked from you, and you
18 would update it, but, I mean, that was the
19 practice. In fact, we were -- there was a
20 legal requirement that you furnish an employee
21 when they left with that information.

22 DR. NETON: Before you could start

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1 employment, you needed to furnish the new
2 employer an AEC Form 4 or NRC Form 4 that
3 establishes what your cumulative dose was to
4 date, and that's the purpose of this form.

5 This has nothing to do with his
6 monitoring program. This has to do with
7 maintaining his cumulative exposure record so
8 that you could enter that and make sure he
9 didn't exceed this 5(N-18) requirement.

10 MR. RAMSPOTT: My point is it would
11 be kind of interesting to see if there is a
12 Landauer report running.

13 DR. ANIGSTEIN: John, let me --
14 John, let me -- let me interrupt you and
15 clarify.

16 MR. RAMSPOTT: Okay.

17 DR. ANIGSTEIN: Landauer -- we're
18 talking about two different things.

19 MR. RAMSPOTT: Yes.

20 DR. ANIGSTEIN: Landauer prepares
21 reports for its client. The client is GSI.
22 Landauer does not prepare reports and send

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1 reports to workers. They send reports to GSI,
2 which is a paying customer.

3 MR. RAMSPOTT: Okay.

4 DR. ANIGSTEIN: The AEC forms are
5 prepared, as far as I can tell, by GSI and
6 given to the worker based on whatever
7 information they have, which would include the
8 Landauer badges.

9 MEMBER POSTON: Only if the worker
10 requested it.

11 DR. ANIGSTEIN: Right, if the
12 worker requests. Now, I can say that for the
13 very last year of this worker, in 1964, where,
14 as Dr. McKeel pointed out, and I completely
15 agree, he was, in fact, monitored, and his
16 name is listed on the Landauer reports to GSI,
17 that were sent to GSI.

18 MR. RAMSPOTT: Okay.

19 DR. ANIGSTEIN: What is here is
20 entirely consistent with what is on his weekly
21 badge reports, so basically this was simply
22 copied from the weekly badge -- not copied,

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1 but assembled from the weekly badge reports.

2 MR. RAMSPOTT: Okay.

3 DR. ANIGSTEIN: It was assigned a
4 dose based on those weekly badge reports. So
5 this was done by his employer, not by
6 Landauer, so to say, you know, Landauer
7 reports to GSI. GSI then reports to the
8 employee, to the worker.

9 MR. RAMSPOTT: Do we know how long
10 Landauer has been in business?

11 CHAIR ZIEMER: They were one of the
12 first film badge companies. They started in
13 the mid-fifties.

14 MR. RAMSPOTT: They should have all
15 those guys' records.

16 DR. ANIGSTEIN: But they did not
17 start --

18 CHAIR ZIEMER: But they may not
19 have been his --

20 DR. ANIGSTEIN: They were not --
21 they were not -- GSI was not their client,
22 because that film badge reports only start --

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1 in other words, we have the first report for
2 January 1964, and, as a matter of fact, Dr.
3 McKeel supplied me the report for the week
4 before that, which is the final week of 1963,
5 and on each report it will say how many
6 previous reports were there for that worker,
7 and all of the workers had a maximum of six or
8 five previous reports, depending on which one
9 you look at.

10 So we simply back-calculate using
11 the calendar that the program started on
12 November 23, 1963, since no one had more than
13 six previous reports as of January '64. So
14 that's how we back-calculated the beginning of
15 the Landauer program.

16 MR. RAMSPOTT: That helps clarify
17 it. So we now know Landauer started when you
18 guys started to get the reports.

19 DR. ANIGSTEIN: Yes. We're missing
20 the first five reports, six reports, but since
21 all the accumulated doses were blank or M, we
22 assume nobody, you know, got any measured

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1 dosage during those first six weeks.

2 DR. MCKEEL: Dr. Anigstein and
3 John, I'd like to interject that when I first
4 talked to Landauer and Chris
5 Passmore[Identifying Information Redacted] in
6 2006, they told me that the program -- they
7 told me the names of the program managers,
8 that it started in November of 1963 for GSI.

9 DR. ANIGSTEIN: Right, which is
10 what I said.

11 DR. MCKEEL: And on the letter that
12 I sent to all of you, there is a specific
13 account number, 2084, Landauer Account 2084,
14 so this idea that there was a lot of Landauer
15 GSI data before November `63 is not supported.

16 DR. ANIGSTEIN: Excuse me. I never
17 said that.

18 DR. MCKEEL: No, I'm just saying
19 for the record that the idea was just floated
20 that there -- I mean, John Ramspott said that
21 maybe Landauer had more data. Landauer was
22 adamant that they did not have earlier data,

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1 and so that 18 quarters of data that Dr.
2 Ziemer admitted seems to have existed must
3 have existed elsewhere, and, like I say, this
4 idea that this data was recorded on AEC forms
5 by GSI, you know, that's one possibility, but
6 that still doesn't explain why Nuclear
7 Consultants Corporation appeared at the bottom
8 of a 1962 March 19[Identifying Information
9 Redacted] report from this worker.

10 DR. ANIGSTEIN: Right.

11 DR. MCKEEL: That still needs to be
12 looked into.

13 DR. ANIGSTEIN: Dr. McKeel, again,
14 to answer another point you made, if you look
15 at the first form, which would be AEC Form 4,
16 and the remaining forms, which are a different
17 AEC form, the reason it has General Steel
18 Industries, Inc., Commonwealth, Inc. on the
19 bottom is the bottom is the box -- I assume
20 it's Box 19, because it follows Box 18. It's
21 cut off. It says "Name of Licensee." That is
22 the name of the licensee.

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1 On the AEC Form 4, it has also
2 "Name of Licensee" near in the lower right-
3 hand portion, and again it said General Steel
4 Industries, Inc., so that is entirely
5 consistent. Now, in addition, in this blank
6 area with no heading, I do agree. There is
7 this -- it says Nuclear Consultants
8 Corporation, Number 110.

9 I did a little also additional
10 research on this company, and they were -- at
11 least, in 1964 they were a radiopharmaceutical
12 supplier, because I found a catalog, their
13 price catalog, on the web for 1964, at least a
14 reference to a price catalog, which is
15 archived by the Smithsonian Institution in
16 1964, and it just simply said
17 radiopharmaceuticals, radioisotopes, and so at
18 some later time they merged with Mallinckrodt,
19 who was also in the radiopharmaceutical
20 business.

21 DR. MCKEEL: That's a current
22 Mallinckrodt business. That's true, but their

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1 name does appear on the bottom of it.

2 DR. ANIGSTEIN: Yes, that's true.

3 DR. NETON: But the only reason
4 that he would obtain this form would typically
5 -- well, a reason he would obtain this form is
6 because he was leaving GSI and going somewhere
7 else, and he needed to demonstrate his
8 cumulative exposure. This could very well be
9 indicating that he was going to this Nuclear
10 Consultants Corporation.

11 DR. MCKEEL: No, he wasn't. He was
12 employed there the full time. This gentleman
13 is very well known. He appears. His
14 affidavits appear. He appears in worker
15 outreach testimonies, and even --

16 DR. NETON: Well, Dan, Dr. McKeel -
17 -

18 DR. MCKEEL: If you all want to
19 clarify it, this man is alive and well and
20 willing to talk to anybody, so you could
21 interview him and get the facts straight.

22 DR. NETON: Okay. Interesting you

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1 only have 18 quarters of monitored exposure,
2 though, almost as if he's some sort of a -- I
3 don't want to call him a jumper, but a person
4 who moved from one facility to another for
5 radiography purposes.

6 DR. MCKEEL: Dr. Neton, he wasn't.

7 He was an isotope licensed AEC person who
8 worked in the betatron on weekends. We know a
9 lot about him, and he wasn't a jumper or any
10 unusual type of thing. He was a mainline
11 important worker there. He appears in one of
12 the photographs of AEC --

13 DR. NETON: How does one explain he
14 has only 18 quarters of monitoring data in a
15 nine-year period?

16 MR. RAMSPOTT: Jim, may I enter
17 something? It's John Ramspott.

18 DR. MCKEEL: I've got to -- I've
19 got to preempt this conversation.

20 MR. RAMSPOTT: Okay. Go ahead,
21 Dan.

22 DR. MCKEEL: Your answer. You are

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1 asking me questions that are not appropriate.

2 This is your job to find out about all the
3 monitoring records for these people. We have
4 provided you with massive amounts of data of
5 all kinds, including initial recognition that
6 there were GSI film badge data at Landauer.

7 Now, why there are 18 quarters is
8 not something that I have to answer. You have
9 to answer that, and if you can't answer that,
10 in my opinion, this is one of the reasons the
11 Board should overturn your recommendation to
12 deny the GSI SEC. It's one of many, many,
13 many reasons, and so I reject that idea.

14 I don't know why 18 quarters is on
15 there, but I would say that all of this
16 discussion raises and keeps raising the level
17 of uncertainty that you all have about these
18 film badge data and what they mean, and as Dr.
19 Ziemer said, the main purpose is what is their
20 value, and I believe that's the thrust of Mr.
21 Ramspott's comments about one worker feeling
22 comfortable picking up another badge.

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1 I would just add to that
2 explanation why it shouldn't be completely
3 accepted on its face is here you have a
4 worker. He picks up a badge, recognizes that
5 it's not his badge, drops it on the floor, but
6 eventually has to turn that badge in to be
7 read to his supervisor.

8 Now, why didn't that gentleman
9 reveal all this information to his supervisor
10 at the time and the supervisor say, "Gee, this
11 is not a proper badge to turn it," and, again,
12 have all the names? Some of those supervisors
13 who collected badges, one in particular gave
14 extensive testimony, and you could call him up
15 if that happens to be the same person.

16 If it's a dead supervisor, that's
17 another matter, but all of those things could
18 be checked and should be. So that's my
19 comment.

20 CHAIR ZIEMER: John, did you have
21 an additional comment?

22 MR. RAMSPOTT: Yes, Jim, I was

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1 going to try and answer your question about
2 the quarters there.

3 DR. NETON: Okay.

4 MR. RAMSPOTT: I don't know.
5 Terry, are you on the line?

6 MR. DUTKO: Yes, sir.

7 MR. RAMSPOTT: I'm going to, if I
8 could, and I always try to watch, make sure
9 I've got my information correct, so I asked
10 another GSI betatron worker to contact this
11 man this morning --

12 MR. DUTKO: I did.

13 MR. RAMSPOTT: -- so I could be
14 clear on employment dates and what have you,
15 because I'm like you, Jim. I see 18 quarters.

16 Okay, let's try to -- let's match this up.
17 Terry, could you identify yourself and share
18 this, if you don't mind?

19 MR. DUTKO: My name is John T.
20 DUTKO. I was a betatron and magnaflux
21 operator at GSI. I talked to this gentleman
22 about 20 minutes before the meeting started.

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1 He is alive and kicking. He stated he started
2 working at GSI in February of 1953[Identifying
3 Information Redacted].

4 I asked him at that time, "Sir,
5 were you badged at that time?" He says he
6 was. He does not recall where the badges were
7 monitored by or who they were monitored by,
8 but they were badged.

9 MR. RAMSPOTT: He definitely worked
10 there in `53-`54[Identifying Information
11 Redacted] era?

12 MR. DUTKO: That's what he said.
13 He was our shop steward[Identifying
14 Information Redacted] in 1964 when I started
15 working there, John, and he also worked in the
16 chem lab, which was -- if you could break down
17 the department, the lower portion, our
18 starting jobs was magnaflux.

19 The middle of the department was
20 betatron people, and the upper echelon, the
21 seniority people, were chem lab people.
22 Jim[Identifying Information Redacted] had been

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1 there quite a number of years. I'm sorry.

2 MR. RAMSPOTT: Okay. That's --

3 CHAIR ZIEMER: Okay. Thank you.

4 MR. RAMSPOTT: I hope that
5 clarifies, and if I could, Terry alluded to
6 something else, and this is -- I think this is
7 key, the badges and the charts and all the --
8 I mean, I've taken these upside down trying to
9 figure them out, and there's one thing that
10 keeps coming back.

11 There is nobody at General Steel
12 that we're aware of that wore a badge 100
13 percent of the time. This individual here
14 with the record we have, his main job was the
15 chem lab. He was an isotope worker. Most of
16 those came out of the chem lab area, and then
17 he worked in the betatron, because the first
18 lead comments today were the badges, that they
19 thought they had all the badges for the
20 betatron workers.

21 Well, this man worked the betatron,
22 and this could be confirmed, and it's in

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1 affidavits. He worked in the betatron part-
2 time to gain overtime hours for pay, and all
3 the badges were only worn in the betatron
4 building unless you were an isotope specialist
5 who went in the 6 Building.

6 So this guy's information, if
7 anything, is partial or incomplete, and maybe
8 it encompasses 20 percent of his possible
9 exposure over there. So the badges -- the
10 bottom line is the badges weren't worn full-
11 time by anybody at GSI that we're aware of,
12 and we've heard that from supervisors,
13 workers. This man will, I'm sure, attest to
14 it.

15 MR. DUTKO: May I comment, Dr.
16 Ziemer?

17 CHAIR ZIEMER: You bet.

18 MR. DUTKO: Magnaflux was the
19 starting position of the department. Badges
20 were never issued to anybody at any time in
21 magnaflux. Only when you reached by seniority
22 and classification were they issued in the

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1 betatron.

2 We worked -- I repeat -- quite a
3 bit of overtime, not 46-hour average, as NIOSH
4 stated. We worked at least a 65-hour average
5 of overtime, at least three shifts a week.
6 That was -- that was the norm, sir, and it was
7 company policy, and I repeat to Dr. Poston, it
8 was company policy that we would not -- we
9 would have to take those film badges off when
10 we left the betatron, and the reason I
11 couldn't answer or give any kind of percentage
12 was that there was so much overtime work.

13 I might be working a standard 40-
14 hour shift in the betatron, but I might work
15 overtime a number of evenings in magnaflux,
16 and the film badges would come off by order
17 when I worked in 10 Building or 9 Building in
18 magnaflux.

19 It was impossible to relate, in all
20 fairness to Dr. Poston's question, what kind
21 of average it was. I would have to have 30
22 timekeepers and go back 50 years to do it. I

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1 answer questions honestly as I can with not a
2 purpose to evade.

3 CHAIR ZIEMER: Thanks for that
4 input. I want to go ahead here. Bob, I'd
5 like to sort of get through the rest of your
6 report here, so you reported on this
7 particular one, and there are obviously some
8 questions here which aren't going to be fully
9 answered today. What else do you have for us
10 in terms of your overall report?

11 DR. ANIGSTEIN: Well, the one that
12 I can make, and I'll just redact it as I'm
13 going along from the one that was sent out
14 just yesterday, yes, and that is basically
15 it's commenting on Dr. McKeel's comments and
16 Dr. McKeel's information, and I'm just going
17 through it.

18 I believe I have actually stated
19 all of it, that it's simply from my reading,
20 and perhaps, Dr. Ziemer, you may have a
21 different opinion, it's not clear from that
22 AEC Form 4 whether there was film badge

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1 dosimetry. When it says record, I don't know.

2 Would you assume that it was a film badge
3 record, just looking at that?

4 CHAIR ZIEMER: I would interpret it
5 that way.

6 DR. ANIGSTEIN: Okay.

7 CHAIR ZIEMER: Certainly.

8 DR. ANIGSTEIN: And certainly this
9 person --

10 CHAIR ZIEMER: As opposed to a
11 calculated value, which they have for the
12 earlier period. In that particular one, that
13 earlier period at -- where was it -- in
14 Pittsburgh overlaps the employment period at
15 GSI. It's almost as if maybe he was -- well,
16 we don't know. I don't want to speculate.

17 He could have gone there for some
18 training, but, in any event, there is some
19 overlap in time there, but if there were
20 earlier film badges prior to Landauer, I guess
21 we don't know who the vendor was.

22 DR. ANIGSTEIN: And the 19 --

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1 CHAIR ZIEMER: There were not many
2 commercial vendors.

3 DR. NETON: In fact, Landauer
4 bought up many of the early vendors as they
5 grew.

6 DR. ANIGSTEIN: The impression I
7 got was, first of all, the 1963 record AEC
8 form is unambiguous. It says film badge.

9 CHAIR ZIEMER: Yes.

10 DR. ANIGSTEIN: So clearly there
11 was something, and, again, I discussed this
12 with, actually, one of the former GSI workers
13 that I was in touch with and also with, again,
14 Dr. Zlotnicki for our -- and our best guess
15 right now, our best -- our prime suspect is
16 that it could have been Picker X-ray for two
17 reasons.

18 They were in the film badge
19 business. Also, they were the suppliers of x-
20 ray film to GSI. That we were told, so it's,
21 you know, not illogical they would have turned
22 to the same vendor, and then at one point they

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1 bought their film badge dosimetry business was
2 bought up by something called Tech/Ops, which
3 --

4 CHAIR ZIEMER: Tech/Ops and
5 Landauer came together later.

6 DR. ANIGSTEIN: -- which also
7 bought Landauer.

8 CHAIR ZIEMER: Right.

9 DR. ANIGSTEIN: And a final piece
10 of information, in the Landauer office
11 headquarters, in their storage area there is a
12 file cabinet marked Picker X-ray. That's the
13 extent to which we know, so one can -- now I'm
14 off in fairytale land. I usually don't like
15 to go there.

16 Perhaps Picker X-ray was a
17 supplier, and perhaps they terminated their
18 business just about November '63, and
19 therefore GSI turned to Landauer. I mean,
20 that's just a wild guess.

21 CHAIR ZIEMER: Well, we don't know.

22 Now, so we have -- we have fairly complete

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1 film badge records from the start of the
2 Landauer period to the end.

3 DR. ANIGSTEIN: Totally complete.

4 CHAIR ZIEMER: They are associated
5 with specific workers. There are questions
6 that the Petitioners have raised about the --
7 I guess you'd say the misuse of badges.

8 Sometimes it appears mischievous in
9 the sense that maybe trying to get other
10 workers in trouble or whatever it was. There
11 are issues about whether the badges, because
12 of limitations to where they could use it,
13 were there other areas that they should have
14 been monitored or could have been monitored in
15 the facility, and we'll have to deal with that
16 separately, but that's one of the issues
17 that's been raised.

18 DR. ANIGSTEIN: Yes.

19 CHAIR ZIEMER: Is there additional
20 exposure unaccounted for? And then we'll have
21 to reach a point where NIOSH, and I don't know
22 if we're there, yet, Jim, but where NIOSH

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1 indicates or makes a determination as to how
2 they will use these film badge records.

3 Will there be facility bounding?
4 Will there be individual records, which
5 normally you would use, anyway, and how would
6 you account for cases where exposures outside
7 the betatron area might have occurred? And I
8 think there were the additional concerns about
9 inadvertent exposures in areas in proximity to
10 the shielded facility, including sky shine and
11 scatter and those kinds of things.

12 But -- and you haven't had SC&A's
13 report very long, either, but are you in a
14 position where you can give us a preliminary
15 indication of the degree to which you see you
16 would use the Landauer data and also whether
17 it's -- whether there are areas to explore on
18 supplementing that for those earlier years?
19 Give me a feel for where -- what the next
20 steps might be.

21 MR. NETON: Well, maybe Dave can
22 start, and I can finish.

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1 CHAIR ZIEMER: Well, I put you on
2 the spot, because I think in one sense we have
3 some good records, but there are some issues
4 raised by the Petitioners. There are some
5 additional issues that -- well, I think we
6 still want to hear maybe the -- also the issue
7 of how we deal with the energy dependence.

8 I sort of know the answer to that,
9 but I think we need to make sure that we're on
10 the same page on energy dependence. This is a
11 high-energy facility, as well as -- and that
12 issue had been raised as to how to use the
13 numbers, and then what do we do on the earlier
14 years? Any thoughts at this point?

15 MR. ALLEN: Well all the B- I mean,
16 first step is all the sources of radiation.
17 We have to sort out what we think actually
18 happened there as far as modeling, et cetera,
19 and that -- exactly when the badges were worn,
20 where they were, et cetera, and that helps us
21 determine what the usefulness of the film
22 badge data is going to be.

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1 I don't know if we've got all those
2 answers yet. There's a few things to sort
3 out, so basically we're down to where we have
4 to sort out the details to know exactly how
5 we're going to use that data.

6 DR. NETON: I would say right now
7 there is nothing -- the film badge data that
8 we do have clearly indicates, at least to me,
9 that the model that was developed using the
10 betatron exposures very well bounds the
11 exposures of the workers.

12 Now, there are some pieces of
13 extrapolation backwards. I'll grant Dr.
14 McKeel that that's an issue, and then also
15 these additional what I call ancillary sources
16 of the additional radiography devices need to
17 be factored in there, but I think it's been
18 our position that the assumption that a person
19 working full-time essentially at the betatron
20 activity would be bound -- that dose would
21 bound any exposure that they would receive
22 using these individual sources of radiography,

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1 but we need to go back and clearly show that.

2 So, I guess, to answer, we're not
3 there yet, but I don't know to what extent
4 we're going to be able to rely totally on the
5 film badge data if we can't find any data
6 prior to '64 other than sort of this bounding.

7 Dave might have some different thoughts on
8 that. This is not -- these are just
9 preliminary thoughts on my part.

10 I am intrigued, though, by what Bob
11 Anigstein talked about, this Picker
12 information. This is the first I've heard of
13 this. It wouldn't be unlike that if we have
14 Landauer and we would search their contracts
15 they would have given us data from when they
16 had contracts, but they may have indeed picked
17 up records from this Picker company, and they
18 exist in some file drawers there.

19 MEMBER BEACH: That was my
20 question. Are you going to research that?

21 DR. NETON: We're going to look
22 into that. This issue came up in context of

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1 another facility just recently, I think. I
2 can't remember. Maybe I dreamt that, but,
3 anyway, I think it's worth pursuing.

4 I don't know to what extent we're
5 going to be able to get there and how well
6 Landauer may be willing to cooperate. You
7 know, they are in the business to make money.
8 We have to figure out, you know, how we might
9 get access to those records even if they do
10 exist.

11 CHAIR ZIEMER: Well, and it may not
12 have occurred to the Landauer people when the
13 requests were made either by you or Dr. McKeel
14 to go back and search Picker records. My guess
15 is that one reason Landauer would keep those
16 would be if someone from earlier on said, "I
17 have Picker x-ray or film badges. What are my
18 records?" but they may very well not have gone
19 back, so it certainly needed to be explored and
20 see if there are some earlier things there.

21 DR. ANIGSTEIN: Probably one reason
22 was that, according to Dr. Zlotnicki, Landauer

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1 was one of the first companies that
2 computerized their records, and we're talking
3 about 1963. This was very early, and so
4 therefore they went into their computer files
5 to get -- to find out, get these, and if Picker
6 was just paper records, they would obviously
7 not have been included.

8 CHAIR ZIEMER: Right.

9 DR. NETON: And that's the other
10 issue. They may be in a file vault of
11 thousands of records that are completely
12 uncatalogued and unorganized, which may be very
13 difficult.

14 MEMBER BEACH: Well, I mean --

15 CHAIR ZIEMER: I need to ask the
16 question.

17 DR. ANIGSTEIN: People organized
18 records before there were computers.

19 DR. NETON: When they turn them over
20 to other organizations and they file them, they
21 can be quite disorganized, but we do need to
22 look at that.

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1 CHAIR ZIEMER: Okay, so we've got --
2 so NIOSH will be needing to follow up on
3 additional records there. Now, realizing that
4 the AEC 4 forms in general are kept by
5 employers, as opposed to, for example, the
6 Landauer film badge records kept by the vendor,
7 but do we -- you have the individual files of
8 the workers or claimants, or do you know
9 whether AEC 4 forms are available on any other
10 workers?

11 DR. NETON: That's a good question.
12 I don't know. I have not run across any in my
13 searches of these forms, but, you know, it may
14 be -- I mean, those don't go into the
15 individual exposure record files. They're
16 merely sort of a entry card, if you will,
17 although they probably --

18 CHAIR ZIEMER: Well, it would depend
19 on the facility. I know that at our place we
20 always had a copy of it in the individual's
21 file. Usually it was the copy from when they
22 started work and when they came to you, and

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1 then if they left, you generated a copy,
2 because you were required to provide that
3 information, and that was available for the
4 next employer.

5 DR. NETON: I guess that's my
6 question is where would we go look for such
7 forms, because the person would leave GSI and
8 go virtually anywhere. Mallinckrodt's a
9 possibility.

10 CHAIR ZIEMER: Well, for example, if
11 we generated the form, we would give it to the
12 worker. Some places would keep what was then a
13 carbon copy for the file, but there was no
14 requirement to do that, because you often had
15 the original records, or you didn't depend on
16 the AEC 4 form. It was used for the worker in
17 transitioning from one location to another.

18 DR. ANIGSTEIN: Well, according to
19 all the GSI workers that are, you know, part of
20 this group that communicates with each other,
21 apparently there was only one other one who
22 said he had records, and he left them in his

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1 mother's house, and after his mother died, the
2 house burned down, and there went the records,
3 but nobody else came up and said they had
4 records.

5 CHAIR ZIEMER: Now, there is one --
6 there is one --

7 DR. MCKEEL: Excuse me, please.
8 This is Dan McKeel.

9 CHAIR ZIEMER: Yes, Dan?

10 DR. MCKEEL: I'll just mention again
11 we do have forms. I'll have to look and make
12 sure whether it's the AEC Form 4, but we do
13 have reports that one other worker, whose name
14 is known and was in the 2006 August 11
15 transcript that you all have access to, who
16 gave us some forms that look similar to me that
17 the ones that we've been discussing were that
18 had AEC, Atomic Energy Commission, across the
19 top, and so we have those type of forms from --

20 CHAIR ZIEMER: From some others?

21 DR. MCKEEL: Two workers. Two
22 workers total. I also comment that this

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1 comment about looking in the workers' files,
2 you know, the only file we have is for people
3 who file claims at --

4 CHAIR ZIEMER: Understood.

5 DR. MCKEEL: -- at GSI, because all
6 GSI original records have been lost. John
7 Ramspott and I have spent several years trying
8 to find out whether the successor companies
9 that bought the intellectual property of GSI,
10 National Roll, for instance, in Pennsylvania,
11 whether they had any carryover records from
12 GSI, and we actually have a person who
13 investigated that, and we have not been able to
14 uncover or discover any residual records.

15 And we do have the affidavit
16 statement of one worker who was there until
17 National Steel actually sold the old GSI
18 properties, and I think in 1982 a lot of
19 additional records were burned --

20 CHAIR ZIEMER: Right.

21 DR. MCKEEL: -- that belonged to
22 GSI, so it's just possible that those old files

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1 and employee files were gone.

2 And so what we would now have access
3 to is those few people who may have kept their
4 forms, but we have asked specifically all the
5 living people did they have any reports like
6 the ones we're discussing that had Atomic
7 Energy Commission on the top, and they said no.

8 I also asked Landauer back in 2006
9 did they -- I mean, what did they know about
10 the Atomic Energy Commission reports, and they
11 said that at one time, without being specific
12 about the years, that Landauer would send a
13 copy of their reports to the Atomic Energy
14 Commission, who would then generate a year-end
15 cumulative report that went back to the plants,
16 and then they said, "Then Landauer stopped
17 doing that," and I'm not sure what the time
18 frame was, but, anyway, that's all I know about
19 that.

20 CHAIR ZIEMER: Well, in fact, those
21 AEC 4 forms would not have been required for
22 betatron workers in any event, because they

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1 wouldn't be licensed people. They would have
2 been required for the cobalt and cesium
3 radiography sources and for the individuals.
4 You said there were some that were handling
5 radioisotopes. In fact, the one individual
6 whose records we were looking at apparently --

7 DR. ANIGSTEIN: That's the cobalt.

8 DR. MCKEEL: Both people that we
9 have those AEC reports from were isotope
10 workers.

11 CHAIR ZIEMER: Right.

12 DR. MCKEEL: And the isotopes that
13 we are aware of, there was no cesium sources,
14 but we are aware of an iridium --

15 CHAIR ZIEMER: Oh, iridium. I meant
16 iridium.

17 DR. MCKEEL: One 92 source in the
18 1950s and then the two cobalt-60 sources.

19 CHAIR ZIEMER: Those radiography
20 sources are the ones I meant.

21 DR. MCKEEL: Right.

22 CHAIR ZIEMER: Yes, thank you for

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1 clarifying that. Okay, so we have some follow-
2 up to do on the film badge data before NIOSH
3 will be able to answer the extent and method
4 for which they will use them, and that includes
5 perhaps some additional detective work on
6 whether Picker, the Picker records will
7 supplement this in any way.

8 I do want us to also -- John, if
9 you'd take just a couple minutes to tell us
10 where we are on the SEC petition review
11 process, because we're going to -- you know,
12 we've got to address that in tandem with these
13 issues here that we're look at, as well, and we
14 will want to schedule a meeting as soon as you
15 guys have reviewed that and NIOSH has a chance
16 to see your comments on it. The petition was
17 presented at the last -- or the evaluation
18 report has been presented, and the Petitioners
19 are waiting, so --

20 DR. ANIGSTEIN: Well, I will start
21 off by simply saying it was approximately three
22 weeks ago that we were given --

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1 CHAIR ZIEMER: Right.

2 DR. ANIGSTEIN: -- the assignment to
3 do this.

4 CHAIR ZIEMER: No, I wasn't
5 expecting it to be done today.

6 DR. ANIGSTEIN: Yes, exactly. No,
7 there has been, and, actually, I have been
8 working on the film badge, you know, follow-up
9 work, so not very much progress has been made.
10 We went through this, and I can give you some
11 very, very preliminary impressions. We may not
12 even -- you know, we may contradict ourselves.

13 CHAIR ZIEMER: Okay. Don't divulge
14 anything if you're not ready to.

15 DR. ANIGSTEIN: Okay. Well, then,
16 in that case, I better say we have no, because
17 we don't have any even tentative results --

18 CHAIR ZIEMER: Okay.

19 DR. ANIGSTEIN: -- at this time.

20 CHAIR ZIEMER: You're still
21 reviewing it?

22 DR. ANIGSTEIN: We're still

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1 reviewing it. It would be unsafe to --

2 CHAIR ZIEMER: What kind of a
3 timetable do you think you will have, because -
4 -

5 DR. ANIGSTEIN: What kind of a
6 timetable do we need to?

7 CHAIR ZIEMER: Well, like many of
8 the SEC petitions, we feel some degree of
9 pressure to turn the information around. We
10 need to balance, you know, doing a thorough
11 review while still being timely.

12 It's a difficult balance, but
13 looking ahead on the calendar, for example, we
14 have a face-to-face meeting. Well, let's look
15 at where our next face-to-face meeting is. May
16 in Amarillo.

17 DR. NETON: May.

18 CHAIR ZIEMER: And if we are going
19 to do anything in Amarillo, it means that we
20 would need to have something in early May, say,
21 so here we are halfway into March already, so
22 it's --

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1 DR. ANIGSTEIN: That's a little --
2 that would be a little -- that would be a
3 little aggressive, so I think let's just --

4 DR. MAURO: Yes, if I may, I'd like
5 to try to clear away a lot. When we last met
6 and we concluded our last meeting, this group,
7 we did discuss those aspects of the site
8 profile review that you've been talking about
9 that in our mind clearly and unambiguously at a
10 minimum represent SEC issues.

11 CHAIR ZIEMER: Right.

12 DR. MAURO: I mean, it's not that we
13 have to do a lot of -- you know, we are
14 immersed in the site profile and with surfaces.
15 I mean, really, it's almost like it's done.
16 You know, I do this all the time, but you're
17 into two big issues. One is what are you going
18 to do about 1953[Identifying Information
19 Redacted] to when you have the data?

20 CHAIR ZIEMER: Right.

21 DR. MAURO: And that's what we've
22 been talking about.

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1 CHAIR ZIEMER: Right, and can you
2 bomb the dose?

3 DR. MAURO: And you have to somehow
4 deal with that, and second, yes, there are a
5 lot of locations throughout this facility where
6 based on the work we've done to date as part of
7 the site profile where there could be elevated
8 irradiation levels where people were not
9 wearing badges, and so you have these two
10 places --

11 DR. ANIGSTEIN: Excuse me. Can I
12 interrupt?

13 DR. MAURO: Sure, yes.

14 DR. ANIGSTEIN: Not where people
15 were not wearing badges but exposures of people
16 who were never issued badges.

17 CHAIR ZIEMER: Yes, that's what we -
18 -

19 DR. ANIGSTEIN: That's the point.

20 DR. MAURO: No, I appreciate the
21 clarification.

22 DR. ANIGSTEIN: But both.

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1 DR. MAURO: Right.

2 DR. ANIGSTEIN: And even the
3 betatron worker could have gone to the bathroom
4 and leaving the betatron building hangs his
5 badge up on the rack, and the bathroom happened
6 to be an exposure area from the betatron.

7 CHAIR ZIEMER: Right. Understood.

8 DR. ANIGSTEIN: So, you know, so you
9 have that.

10 DR. MAURO: What I like to do
11 sometimes is really some common sense aspects
12 of this. Yes, we're going to finish our
13 report. We're going to do our formal review,
14 and we'll deliver it on the SEC petition, where
15 we will address the petition issues and the
16 degree to which NIOSH has addressed those
17 issues in the evaluation report.

18 But, at the same time, I don't want
19 to lose sight of some of the simplicities of
20 some -- when I say simplicity, in essence it's
21 clear that lacking data from `53[Identifying
22 Information Redacted] to `64 is, in my mind,

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1 the single biggest SEC issue on the table.

2 Without film badge data, with lots
3 of folks working with iridium, cobalt-60, quite
4 frankly, the betatron model, we have a betatron
5 model where, I mean, in principle we could
6 figure out and model what we think the
7 radiation feedings were based -- we've done it,
8 and we are not --

9 You know, we have our estimate. You
10 have your estimate. We have estimates inside
11 the shield, outside the shield, in the
12 bathroom, up on the crane. In other words, in
13 theory, we are in a very good position to start
14 to understand what the potential upper bound
15 might have been of the radiation fields in the
16 vicinity and outside the shield wall. How much
17 time people spent at each location, you know,
18 that's another question.

19 So, I'm, you know, as part of this
20 work group, I'm more concerned about the time
21 period where there is no film badge, and I am
22 very encouraged by the fact that there may very

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1 well be some film badges out there. I mean,
2 when I say encouraged, that would be very
3 valuable. So --

4 DR. ANIGSTEIN: For those workers
5 who were badged.

6 DR. MAURO: For those workers who
7 were badged, it will certainly enrich our
8 understanding of what the range of exposures
9 might have been. That doesn't mean we've
10 solved the issue of what about the workers that
11 were not badged or at a given period of time
12 were not wearing their badge, and that goes for
13 post-'64, and that goes for post-'63, so it
14 applies across the board.

15 In any event, I mean, I don't want
16 to -- I don't want to leave the impression that
17 we are not in -- we are in very much a position
18 to understand what the SEC issues are.

19 DR. ANIGSTEIN: Other, you know,
20 other issues along that line, for instance, the
21 instance -- and we only know of one instance.
22 There may have been others -- where a worker

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1 not involved with radiography literally -- and
2 I thought I maybe misstated, but no, I went
3 back, and I looked at the testimony --
4 literally put the source in his pocket and took
5 it home, I mean, which means, obviously, that
6 worker got an exposure, but more than that,
7 having been a radiation safety officer for a
8 short while one time, and so I recognize that
9 means there is a total breakdown of radiation
10 control.

11 If such an incident could happen, I
12 guess the question is what else could have
13 happened that nobody -- that of the handful of
14 survivors of this -- of that workforce that we
15 happen to be in touch with recall? Maybe there
16 were other things they didn't know about or,
17 you know, happened to other people. That's,
18 you know, that's one aspect.

19 The other aspect is looking at the
20 film badge readings outside the monitored
21 period. During the monitored period, during
22 the period that was monitored and was during

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1 the AEC operation period, there was only one
2 exceptionally high reading on one weekly
3 reading, but then later on there were several
4 in addition to these two that were mostly
5 likely artifacts.

6 There were several, which indicates
7 that there could have been incidents with the
8 betatron or, more likely, and, again, this is
9 from what I have gathered from talking to
10 people, a stuck isotope source where the -- I
11 think they called it the tail didn't retract
12 properly, and suddenly somebody gets a 7.5 rem
13 reading for one week.

14 There could have been others in the
15 early period or even in those couple of years,
16 which -- well, probably, let's say, in the pre-
17 19 -- pre-November '63 period. So it's very,
18 very hard.

19 How do you place upper estimates on,
20 you know, on exposures when you've had these
21 few, albeit few, but, you know, very high
22 readings? It's -- you know, then it becomes,

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1 of course, a policy issue of what constitutes
2 a, you know, a maximum exposure, I mean, you
3 know, a plausible maximum exposure, but these
4 are the --

5 So we're not saying -- I mean,
6 neither John or I are saying what our
7 recommendation is going to be, but these are
8 the kind of things which are --

9 CHAIR ZIEMER: Issues that you're --

10 DR. ANIGSTEIN: Issues.

11 CHAIR ZIEMER: -- thinking about.

12 Okay.

13 DR. ANIGSTEIN: Yes.

14 DR. MAURO: By the way, from our
15 perspective in delivering a report that's going
16 to be helpful, let's say, in support of a May
17 Amarillo meeting, the work that -- is that not
18 possible?

19 DR. ANIGSTEIN: I don't think we can
20 have a finished report.

21 DR. MAURO: But bear in mind -- I
22 understand, and I don't want to put you in a --

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1 put SC&A in a position of making a commitment
2 that we can't meet. However --

3 CHAIR ZIEMER: I'm just saying we
4 want to move ahead as rapidly as possible.

5 DR. MAURO: We want to move ahead,
6 but bear in mind, when all is said and done,
7 you know what our concerns are. We just talked
8 about them.

9 CHAIR ZIEMER: Right.

10 DR. MAURO: And what you find out --

11 CHAIR ZIEMER: And the film badges
12 and the bounding will become part of that, too
13 --

14 DR. MAURO: Yes.

15 CHAIR ZIEMER: -- for the SEC, as
16 well.

17 DR. MAURO: Yes.

18 CHAIR ZIEMER: I assume they will.

19 DR. NETON: I mean, we're going to
20 pursue it. My concern is that if we have to
21 cover every possible incident that could have
22 conceivably occurred using high radioactive

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1 sources, then we're wasting our time going to
2 look at film badge data. I mean, you know --

3 DR. MAURO: Yes, what are we talking
4 -- yes, I think we've got a -- this is a
5 serious problem.

6 DR. NETON: If there is a -- if
7 there is a potential incident that could have
8 occurred or one had occurred, and that is going
9 to be used as the poster child for the fact
10 that you can't do dose reconstructions, why
11 would we even bother to go look through all
12 these Picker X-ray data for? What's the
13 utility of that?

14 MR. RAMSPOTT: Doctors, this is John
15 Ramspott.

16 CHAIR ZIEMER: Yes, John?

17 DR. MCKEEL: John? Go ahead.

18 MR. RAMSPOTT: Dr. Ziemer?

19 CHAIR ZIEMER: Yes, we're listening,
20 John.

21 MR. RAMSPOTT: Dr. Neton just made a
22 very, very important point. The one gentleman

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1 that we have documented of having an accident
2 apparently had it one week, and Dr. Anigstein
3 can correct me, because you guys have all the
4 records of badge information being available
5 for this individual.

6 According to, and this is just what
7 Dr. Ziemer or, I'm sorry, Dr. Neton started to
8 say, if this individual, according to the
9 records, looks like a poster child for
10 radiation safety, you've got one week before
11 that, and we know the exact date, because he
12 was home sick, had the day off the day before
13 Kennedy got shot.

14 He watched Kennedy get shot, so we
15 know the exact day, and yet we don't have any
16 of his records. He comes back as a poster
17 child, "Oh, there is no danger." He had an
18 accident over at GSI, was sent to the hospital,
19 sent home, yet his records make him look like a
20 cream puff.

21 So I agree with Jim. If you don't
22 have all the good data, you're really wasting

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1 your time.

2 DR. MCKEEL: Can I please make a
3 comment? This is Dan McKeel. I need to make a
4 comment here.

5 We sent the Board and SC&A recently
6 that worker's declaration made soon before he
7 died, and, you know, it explains that instance
8 in great - incident - in great detail, and it
9 mentions that either an AEC report was made, or
10 it was deemed to be AEC reportable.

11 So whereas it may be not equivalent
12 to a criticality incident, it certainly was a
13 major incident involving one of the main, we
14 think, isotope sources that has not yet -- that
15 source has not at all been characterized. We
16 don't have the AEC license for that source
17 term. We don't even know what size it actually
18 was, the manufacturer, et cetera.

19 So here we have a worker that's
20 involved and at least was, you know, sent home
21 from his workplace and has an affidavit to that
22 extent, so we already do have one worker who,

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1 in my opinion, should be granted an 8314 SEC
2 just on the very face of the information
3 already provided, and, of course, as you all
4 well know, Mr. Ramspott and I have been
5 advocating since 2005, when we first outlined
6 the six radiation source terms at GSI, that
7 this site, if any ever deserved it, should have
8 gotten an 8314 long ago.

9 So, you know, Dr. Neton's comment
10 not only is pertinent, but, really, NIOSH ought
11 to go back and think about the implications of
12 what they've just said and think about all the
13 uncertainties that there are in our discussions
14 of film badges, the fact that the models, which
15 one way to look at it is that the models well
16 bound the overall dose. Another way to look at
17 it is that the models, you know, are 15 to 18
18 times higher than the film badge doses, and so
19 they don't model them very well at all.

20 You know, the level of uncertainty
21 here is enormous, and it is not going to be
22 resolved, I don't believe, by getting even

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1 those old data for the betatron workers who
2 were 100 people out of 3,000 that worked at
3 that plant, and we have provided voluminous
4 data that there were other radiation sources
5 that other workers in Building 6, Building 10
6 were exposed.

7 We have provided affidavits that
8 showed that the uranium itself was carried
9 through the plant on railroad transfer cars,
10 electric cars, and thus could have exposed
11 people in the rest of the plant, as well.

12 So there are enormous uncertainties
13 about this plant, about the job descriptions,
14 about who handled the uranium while it was
15 being transferred in and out of the plant,
16 which was not necessarily the betatron workers
17 themselves.

18 So I just please ask everybody to
19 think about the big picture, that we've been at
20 this now since 2005, and to try to get that
21 research done and get some answers for us, if
22 possible, you know, well before the May

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1 meeting, and at the end of all this, we need a
2 recommendation from the Work Group, whether
3 they support NIOSH's denial of the SEC or they
4 don't, and, of course, we hope and believe that
5 the facts that we've presented thus far marry
6 the recommendation to overturn NIOSH's
7 recommendation, and we ask that that all be
8 borne in mind, please.

9 I ask personally that my points of
10 uncertainty that were addressed to the Board on
11 February 18 -- you know, we're still waiting
12 for that transcript, and when we get it, I
13 would please ask you all to read those, review
14 those, and to think about those uncertainties
15 that I've mentioned, and if you can't resolve
16 those and you can't answer them satisfactorily,
17 please consider my recommendation that we
18 should recommend right now that the NIOSH
19 recommendation be overturned.

20 And I would point out to you that as
21 far as I am aware, although we've talked about
22 it and talked about it for four years, we don't

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1 have a single calculation made of the dose
2 delivered by either of the cobalt-60 or the
3 iridium-192 or the 250 kVp radiation source
4 terms that have been known to be present at GSI
5 from us since the fall of 2005, when we were
6 discussing Mallinckrodt in the original SEC
7 petition. So I guess that's my final comment.

8 CHAIR ZIEMER: Okay. Thanks, Dan.
9 Jim, a comment?

10 DR. NETON: I just want to say
11 something for the record. I want to be clear
12 that I was not necessarily advocating this
13 become an SEC based on these incidents. I was
14 trying to point out that NIOSH does try to keep
15 an open mind, and we certainly need to look at
16 these incidents and put them into some
17 perspective.

18 Now, at the end of the day, I don't
19 know where we're going to end up on that, but
20 you raise a very good point, and I don't think
21 an incident in and of itself is necessarily a
22 reason to make it an SEC, and we need to really

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1 look at this very carefully, though.

2 CHAIR ZIEMER: Well, in fact, where
3 you know an incident has occurred, such as this
4 case --

5 DR. NETON: Right.

6 CHAIR ZIEMER: -- you can, in fact,
7 bound that, because you know the source terms.

8 DR. NETON: The particulars of the
9 incident.

10 CHAIR ZIEMER: I think Bob was
11 talking, raising at least sort of a general
12 question. It may be almost rhetorical, but
13 either incidents we don't know about, and
14 that's the kind where you say, you know, it's
15 sort of unknown incidents, or were there things
16 equivalent to a criticality that we don't know
17 about.

18 DR. NETON: Correct.

19 CHAIR ZIEMER: But those will have
20 to be considered, as well, in conjunction with
21 the issues that Dan has raised, and, Dan, we
22 will not be overlooking the points you made.

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1 DR. ANIGSTEIN: I'd like to -- I'd
2 just like to mention one point.

3 CHAIR ZIEMER: Bob, you have a
4 comment?

5 DR. ANIGSTEIN: One brief comment,
6 Doctor. The SC&A report, which is, I believe,
7 on the web, and, you know, our comments and
8 review of Appendix BB did include detailed
9 calculations of exposures from cobalt-60
10 services, both from a small source used in
11 Building 6 and the large used in the betatron
12 building.

13 CHAIR ZIEMER: And, actually, those
14 are -- those kind of sources, the dose rates
15 are much easier to bound than many things that
16 we work with, but nonetheless that has to be
17 taken into consideration, as well.

18 DR. MCKEEL: It's also true, though,
19 just for the record, that although SC&A has
20 offered calculations that it has not been
21 resolved whether NIOSH or the Board accepts
22 those calculations and believes they should be

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1 part of Appendix BB.

2 CHAIR ZIEMER: Yes, you're quite
3 correct on that.

4 DR. MCKEEL: Okay. All right.

5 CHAIR ZIEMER: Yes, we do know, I
6 think, at least, we know what needs to be done
7 as far as how you approach that. We're going
8 to have to come to closure here today. We have
9 made good progress in closing out some issue
10 matrices.

11 We've gotten some additional good
12 definition on the dosimetry issues and
13 problems. I'm not going to be able to schedule
14 our next meeting until we get a little better
15 feel for when the report will be ready.

16 On the other hand, if, as NIOSH
17 receives and, Dave Allen, as you reach a point
18 on some of these issues where -- well, let's
19 see. I guess we have a white paper, maybe two
20 white papers that we generated. I think
21 whenever those are ready we can at least
22 distribute those and have a chance to react to

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1 them well before we meet, so there are things
2 that we need to be doing as we proceed.

3 DR. MAURO: I would like to usually
4 make sure I understand what SC&A's action items
5 are, and the only ones I have is to provide
6 copies of the Putzier and NUREG citations to
7 the rest of the Work Group. This had to do
8 with the TBD 6000 review. Other than that, we
9 have no action items. Of course, we have our
10 SEC petition. That's done, yes.

11 CHAIR ZIEMER: Right.

12 DR. MAURO: In other words, nothing
13 coming from the Work Group where you expect us
14 to perform.

15 CHAIR ZIEMER: That agrees with what
16 I have here, as well. I want to see if --
17 Mark, did you get back on the line, or Wanda,
18 did you have any additional comments?

19 MEMBER MUNN: No, I've just been an
20 eager listener.

21 CHAIR ZIEMER: Okay. Thank you.
22 Okay, and thanks, Dan and John and the others

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1 for your input again today. We appreciate your
2 being on the line for the day with us. We
3 appreciate your input, as well as your -- I
4 guess I'll say it, and I mean this in a kind
5 way, your persistence in making sure we get the
6 information that we need from you, so we
7 appreciate that. Ted, any other pressing
8 issues?

9 MR. KATZ: I just want to check one
10 other follow-up. So, as I understand it, SC&A
11 has the letters, and you will be providing
12 those then to OCAS and for us for Privacy Act
13 redaction that Dan was referring to.

14 DR. MAURO: The letters, right.

15 DR. ANIGSTEIN: Yes, we will follow
16 up with that.

17 CHAIR ZIEMER: The materials that --

18 MR. KATZ: Dan, we will get you
19 Privacy Act reviewed versions of those.

20 CHAIR ZIEMER: That's the material -

21 -

22 DR. MCKEEL: Thank you.

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1 CHAIR ZIEMER: -- that he got
2 directly from Landauer.

3 DR. MAURO: Okay, I got you.

4 CHAIR ZIEMER: Was that direct from
5 NIOSH?

6 MR. KATZ: Yes, I just want to make
7 sure.

8 CHAIR ZIEMER: Did you get that for
9 your --

10 DR. MAURO: I missed that.

11 CHAIR ZIEMER: -- review so they can
12 get out to the Petitioners in the appropriate
13 form and a timely fashion? And so, Ted, are
14 you going to make sure that gets transmitted to
15 Dan?

16 MR. KATZ: I am.

17 CHAIR ZIEMER: Okay.

18 MR. KATZ: I will be responsible for
19 that.

20 CHAIR ZIEMER: Dan, are you still on
21 the line?

22 DR. MCKEEL: Yes, sir, I am.

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1 CHAIR ZIEMER: Okay, so Ted is going
2 to, as soon as he can get these things cleared,
3 we're talking about the earlier materials that
4 Bob got from Landauer, which --

5 MR. KATZ: Right, the letters or
6 what have you.

7 CHAIR ZIEMER: Yes.

8 DR. MCKEEL: Dr. Ziemer, I do have a
9 comment about that. I did send you and Ted, I
10 believe, what I believe are relevant sections
11 of the FACA law. I think they're Sections 3B
12 and C in which the law as I read it says that
13 presidential commissions such as yours are
14 supposed to -- commissions and advisory boards
15 are supposed to furnish the public with -- and
16 it specifically says in there working papers,
17 so would you all please have your legal team
18 look at that carefully and provide me an
19 answer, because I believe it opens up the
20 possibility, for instance, that the issues
21 matrices that are what's guiding your work,
22 that those are probably considered working

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1 papers, and, honestly, I would be interested in
2 all of these papers like the one this morning
3 that was mentioned.

4 MR. KATZ: We will get -- we can get
5 you those. In fact, Dan, I thought you had the
6 matrices. I'm sorry if you didn't.

7 DR. MCKEEL: That would be good.

8 MR. KATZ: In fact, we cleared a
9 version, not the latest version, because SC&A
10 responded then to NIOSH's responses, but we
11 cleared the NIOSH version of that.

12 CHAIR ZIEMER: We have the NIOSH
13 response version, which was, I think, of this
14 Monday. In fact, I think I sent John Ramspott
15 a copy. I didn't realize you didn't have one,
16 Dan.

17 DR. MCKEEL: Okay.

18 CHAIR ZIEMER: Yes.

19 DR. MCKEEL: Well, I'm really asking
20 for a general --

21 MR. KATZ: And on the broader --

22 DR. MCKEEL: There's a general

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1 ruling on that.

2 MR. KATZ: On the broader issue,
3 Dan, I mean, I followed up immediately upon
4 receiving your email about that, and I'm
5 waiting to close the loop with folks, with
6 counsel folks in the department.

7 DR. MCKEEL: I'm just asking to
8 please keep that alive and ongoing.

9 MR. KATZ: It's completely alive,
10 Dan.

11 DR. MCKEEL: Ask them to please
12 render a decision. I mean, the language seems
13 pretty clear to me, but I understand it may be
14 more complex, so I'd appreciate it.

15 MR. KATZ: It's completely alive. I
16 promise.

17 DR. MCKEEL: Thank you.

18 CHAIR ZIEMER: Well, I think
19 anything that's not -- it's got to be Privacy
20 Act prepared.

21 MR. KATZ: There's all sorts of
22 things like Privacy Act clearance.

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1 CHAIR ZIEMER: As fast as we can
2 provide it --

3 DR. MCKEEL: Okay.

4 CHAIR ZIEMER: -- we will certainly
5 try to do that.

6 DR. MCKEEL: All right.

7 CHAIR ZIEMER: Thank you very much.
8 Anything else here? If not, we are in
9 adjournment. Thank you all.

10 (Whereupon, the above-entitled
11 matter went off the record at 3:53 p.m.)

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