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

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ADVISORY BOARD ON RADIATION AND
WORKER HEALTH

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WORK GROUP ON TBD-6000

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WEDNESDAY
MAY 12, 2010

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The Work Group meeting convened in the Zurich Room of the Cincinnati Airport Marriott Hotel, 2395 Progress Drive, Hebron, Kentucky at 8:30 a.m., Paul Ziener, Chairman, presiding.

PRESENT:

PAUL ZIEMER, Chairman
HENRY ANDERSON, Member*
JOSIE BEACH, Member
MARK GRIFFON, Member
WANDA MUNN, Member
JOHN POSTON, Member
ALSO PRESENT:

TED KATZ, Designated Federal Official
ISAF AL-NABULSI, DOE*
NANCY ADAMS, NIOSH Contractor*
DAVID ALLEN, DCAS
ROBERT ANIGSTEIN, SC&A
JOHN DUTKO*
SAMUEL GLOVER, DCAS*
EMILY HOWELL, HHS
JENNIFER LIN, HHS*
JOHN MAURO, SC&A
DAN McKEEL*
JAMES NETON, DCAS
JOHN RAMSPOTT*
WILLIAM THURBER, SC&A*

*Participating via telephone
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P-R-O-C-E-E-D-I-N-G-S
(8:36 a.m.)

MR. KATZ: Welcome, everybody in the room and on the line. This is Ted Katz, Advisory Board on Radiation and Worker Health, the TBD-6000 Work Group, and we are just getting started, and we’ll begin with roll call.

We are discussing GSI today and another site -- and Bliss & Laughlin, so please, for all Agency-related people, note your conflict of interest information, as well, during roll call, beginning with the Board Members in the room.

CHAIRMAN ZIEMER: Paul Ziemer, Chair of the Work Group, not conflicted on GSI or on Bliss & Laughlin Steel.

MEMBER MUNN: Wanda Munn, Board Member, no conflicts.

MEMBER POSTON: John Poston, Board Member, no conflicts.

MEMBER BEACH: Josie Beach, Board
MEMBER GRIFFON: Mark Griffon, Board Member, no conflicts.

MR. KATZ: Thank you, and do we have any Board Members on the -- on the line?

MEMBER ANDERSON: Yes, it's Henry Anderson. I'm just going to listen, since I'll be 6001.

MR. KATZ: Thank you. Thank you, and you're not conflicted as well, is that correct?

MEMBER ANDERSON: No.

MR. KATZ: Right. And then NIOSH-ORAU Team in the room?

DR. NETON: Jim Neton, NIOSH, not conflicted.

MR. ALLEN: Dave Allen, NIOSH, not conflicted.

MR. KATZ: NIOSH-ORAU Team on the line? Are you expecting any? Okay, SC&A in the room?

DR. MAURO: John Mauro, SC&A, not
conflicted.


MR. KATZ: And on the line, any SC&A?

MR. THURBER: Bill Thurber, SC&A, no conflicts.

MR. KATZ: Welcome, Bill.

MR. THURBER: Thanks.

MR. KATZ: All right. Federal officials, HHS or other agencies or contractors to the feds in the room?

MS. HOWELL: Emily Howell, HHS.

MR. KATZ: And on the line?

MS. LIN: Jenny Lin, HHS.

MR. KATZ: Hi, Jenny.

MS. ADAMS: Nancy Adams, NIOSH contractor.

MR. KATZ: Hi, Nancy.

DR. AL-NABULSI: Isaf Al-Nabulsi, DOE.

MR. KATZ: Welcome, Isaf.
DR. AL-NABULSI: Thanks.

MR. KATZ: Okay, there are no members of the public in the room. Any members of the public on the line?

DR. MCKEEL: This is Dan McKeel. I'm a GSI SEC co-petitioner.

MR. KATZ: Welcome, Dan.

DR. MCKEEL: Thank you.

MR. RAMSPOTT: This is John Ramspott, General Steel advocate.

MR. KATZ: And welcome, John. Very good. Then let me just remind you all on the line to please mute your phones except when you're addressing the group, *6 if you don't have a mute button, and then *6 will take you off mute again when you do want to speak to us.

Please do not put the call on hold. Hang it up and dial back in if you need to break for a bit, and that's it. Thank you.

Dr. Ziemer.

CHAIRMAN ZIEMER: Okay, I will
officially call the meeting to order. Thank you all for being here and participating. We sent out a revised agenda early in the week -- early in the week being like yesterday or, actually, Monday.

The main revision was in item 4(d), where I had changed the general wording so that we specifically had on our agenda addressing some comments provided by the petitioner this past week, so that was the revision.

I did also forget to revise the start time on the written agenda but sent out a follow-up email, so your presence all here indicates that you apparently got the email. We really -- we're starting at 8:30 and not 9:30, so thank you all for the early start time, which is for some a little bit of a hardship in terms of time zones, but we appreciate that, particularly for some of our members who have planes to catch later in the day.
We will go through the agenda as it's given. I haven't given time specifics on any of the items, since that's very hard to predict except that we do want to take our lunch break about midday.

The outside time for adjournment is 5:00. It's not a goal to be reached, but it's a time limit, so if we can complete things before that, that's fine, but we do have a lot of items to cover.

Very specifically, in broad terms we will look at the TBD-6000 matrix and the resolution of issues on the matrix. We will look at the Appendix and related matters in terms of that document.

Then we want to also look at Appendix BB matrix, which is the General Steel Industries issues matrix, and then the General Steel Industries SEC petition, which also has a matrix for which we are going through the resolution process. And then, finally, we have Bliss & Laughlin Steel, and that will
occur at the latter part of our meeting,

So I don't know if any of the Bliss & Laughlin Steel people plan to be here, and I think one or two other NIOSH people will be joining us later in the day, as I understood from --

DR. NETON: Sam will be on later.

CHAIRMAN ZIEMER: Sam Glover will join us, I think, this afternoon, but we have a couple items to address on Bliss & Laughlin but probably won't be spending too much time on that yet today but some carryover items on that.

So, with those introductory remarks, I'd like us to move to the TBD findings matrix and the status of the various issues. Now, Dr. Mauro provided for us what was identified as the current copy of the issues matrix, that is, the copy that has the various responses and replies, and that was updated through October 14 of last year.

We do have some things that we
discussed in our last meeting, which was in December, and I had -- I had prepared some reminder notes for the Work Group Committee, or the Work Group Members on the carryover items.

That particular meeting was actually held on December 16. Those notes I sent out said it was December 12, but it was actually the 16th, but in any event, there were some items which we'll identify as we proceed here.

It would -- if you want to follow along, what John Mauro presented was material which I think has already been distributed in the past. It was a copy of the matrix, and John also attached some White Papers that we've had in the past, just in case you lost track of them.

The paper on resuspension factors was included, which is an October 2009 paper. There was a White Paper from SC&A dealing with, actually, NIOSH comments on issue 4,
which was a NIOSH White Paper dated October 2009. That was dealing with the Adley data.

   There was a NIOSH White Paper, another one. Is it the same one? No, another one dealing with the Adley data dated October 9, so we had those White Papers attached. Actually, there was also a NIOSH -- no, an SC&A White Paper dated October 13, which also dealt with the surface contamination, I believe. Yes.

   So those are all White Papers we've had in the past, and John just pulled them together so you would have them all in a group.

   DR. MAURO: There's one more.

   CHAIRMAN ZIEMER: Dr. Mauro, you have a comment?

   DR. MAURO: Yes, there's one more important one that I neglected to include here that was distributed, SC&A White Paper on December 30, that is probably on your system that I asked Nancy Johnson this morning to
send everyone on the Board a copy of it. It's an important one.

MEMBER GRIFFON: It's there.

DR. MAURO: And it's there, so that's -- that brings -- as far as I know, that brings us up to date on delivering to you all the White Papers that we've completed --

CHAIRMAN ZIEMER: Right.

DR. MAURO: -- through the end of -- through today.

CHAIRMAN ZIEMER: Right.

DR. MAURO: I'm sorry. I just neglected --

CHAIRMAN ZIEMER: But these are not new White Papers.

DR. MAURO: Nothing, no.

CHAIRMAN ZIEMER: And we should have had them all --

DR. MAURO: Yes.

CHAIRMAN ZIEMER: -- in the past, and I just want to double-check. Were the copies that were distributed all PA cleared?
Do the Petitioners have all of those?

DR. MAURO: It would be on the bottom. I'd have to say --

CHAIRMAN ZIEMER: Well --

DR. MAURO: -- it's possible it's not.

CHAIRMAN ZIEMER: I think one of the problems is these initial drafts all were the uncleared copies, but I believe these have all been PA cleared since then.

MR. KATZ: I believe so.

CHAIRMAN ZIEMER: Emily, are you in a position to double-check that?

MS. HOWELL: I mean, I know the one that was sent this morning had a PA cleared version.

MR. KATZ: Well, as a matter of routine we've been PA clearing all of the GSI materials.

CHAIRMAN ZIEMER: Right. Right. I wanted to make sure.

MS. HOWELL: They're all old,
though.

CHAIRMAN ZIEMER: As far as I know, and Dan McKeel, if you're on the line I'll just ask you. Are there any of those papers that I identified that were not provided to you originally, as well?

DR. MCKEEL: The one that I don't know that I have is the one Dr. Mauro mentioned was from December 30. Maybe the title of that would help, but I don't think I have that.

CHAIRMAN ZIEMER: That's the one you said you just sent out this morning, resent this morning?

MS. HOWELL: The resend this morning had the non-PA cleared and a PA cleared.

DR. MAURO: Okay.

CHAIRMAN ZIEMER: There is a PA cleared version?

DR. MCKEEL: The PA cleared version is this January 14.
MR. KATZ: Okay, so that's it, then.

DR. MCKEEL: Was that sent to me?

CHAIRMAN ZIEMER: If not, we can probably resend it. I thought those had all been distributed to the full list.

DR. MAURO: Probably, but I wouldn't want to say without confirmation.

DR. MCKEEL: Okay. Thank you.

DR. NETON: The one that I received this morning did not have Dr. McKeel on distribution.

MS. HOWELL: No, because it had a non-PA --

MR. KATZ: That's the non-PA cleared.

MS. HOWELL: They're both non. If you want to forward just the PA-cleared version to him, you can.

DR. NETON: That's almost impossible for me to do within the --

CHAIRMAN ZIEMER: Well, one of the
problems we're having right now, and I think it's a problem with the CDC main computers, is getting emails out of our -- out of our NIOSH computers here. I mean, Jim Neton sent me an email earlier this morning, and it has not arrived.

MR. KATZ: There's a network problem.

CHAIRMAN ZIEMER: There's a network problem, so, in any event, we'll try to get that to you, Dan, to make sure you have it.

DR. MCKEEL: Thank you very much.

CHAIRMAN ZIEMER: Now --

MEMBER MUNN: I think this was sent on January 14. The original one doesn't appear to have Dan on distribution.

MR. KATZ: Yes, I mean, it gets sent to Dan separately. It would not have it on -- you would not show it on yours, because Laurie Breyer normally sends them, and sometimes I send them if I get them before Laurie.
MEMBER MUNN: Just asking. Okay.

CHAIRMAN ZIEMER: Okay. In any event, we have the matrix, and last time we had issue 1, which we were working with, and we had a very long discussion on issue 1. There were several carryover questions, and I'm looking for my copy of those. Here they are.

Incidentally, Board Members, Work Group Members, on the notes that I sent you, the reminder notes, if you go back to the transcripts, because I gave you transcript pages where we agreed to do certain things, I have discovered that there are also several versions of the transcripts.

There's the ones that come directly from the transcribers, and then there's the PA-cleared versions and the non-PA cleared versions --

MR. KATZ: Certified versions.

CHAIRMAN ZIEMER: -- and those things cause the page changes or the page
numbers to change a little bit. So, for example, I referenced this first one dealing with the Putzier effect as being on page 68, but I noticed the version I was working with last night it shows up on page 65 for some reason.

In any event, those are just little sidelights in case you're tracking these down, but on the first issue, I have a note indicating that NIOSH agreed to add a discussion of the Putzier effect in the one they discussed in their White Paper in TBD-6000 and that the TBD language would be revised, so there is that issue, the revision of TBD-6000 relative to that particular issue.

There were some related issues dealing with the assigning of the dose values, and those are discussed -- were discussed in our last meeting, and we had also an indication that SC&A would deliver an analysis for us, and, John, you have done that, so we have that.
We'll come to that in just a moment, but what I would like to ask now, on the commitment to revise TBD-6000, do we know when that will happen? And, in that context, there are some other items which we may come to a little later.

But, for example, the petitioner on GSI has asked about other issues that might show up in TBD-6000, and those are included in the petitioner's points that we're going to discuss in a -- a little later in the day, but I'll just refer to that particular point from Dr. McKeel's document.

It said TBD-6000 is evaluating the MCW ingot -- section, no uranium alloy section, no non-destructive testing section or non-destructive testing, radiography detail guidance for dose reconstruction, no thorium section. Needs to be urgently revised and so on.

In my view, we have agreed, certainly, with the issues of the ingots,
dingots and the uranium alloys and the thorium and the non-destructive testing all need to be addressed, although some of those might be considered site-specific for General Steel Industries, but we've already committed on the intention on the thorium and the Putzier effect, which then address dingots, ingots, I guess, to include that in TBD-6000.

I'm not sure how general the other radiography procedures are. In my mind right now, that seems to me to be site-specific and could be addressed in the individual appendices unless there is some indication that every site of this type does that.

Let's see. What would the other one have been? Well, I guess -- I guess that was the one that I had a question on, whether that should be in TBD-6000 versus the Appendix BB. Dave, did you have any comments on that?

MR. ALLEN: Well, I agree with pretty much everything you just said. I don't think the -- I don't know if radiography is
generic enough to be in the body of TBD-6000.

It seems to be more of a site-specific appendix -- for each site that has that, and just to follow up with what you're saying, we've already agreed that we were going to revise TBD-6000 to deal with issues 1 through 3 --

CHAIRMAN ZIEMER: Right.

MR. ALLEN: -- on the matrix, and I think it was the last meeting where we asked for some clarification on issue 1, because we had agreed the TBD would benefit from the discussion, but we thought the numbers covered it, and I wanted to clarify.

And the clarification was no, there wasn't agreement that the numbers in the TBD-6000 covered it, that issue was still on the table, and that led to a long conversation.

CHAIRMAN ZIEMER: Right.

MR. ALLEN: I think the final answer was the White Paper that SC&A delivered
in December, and I think that part has to be
discussed here a little bit, and if there is
some kind of agreement, then we're pretty much
set for TBD-6000 to revise.

CHAIRMAN ZIEMER: Ready to do the
revision.

MR. ALLEN: Right.

DR. MAURO: With regard to Dr. McKeel's question on betatron, my sense is
that it is one of those special cases where it
doesn't -- wouldn't necessarily be appropriate
to make it as part of the generic TBD-6000.

However, it would also be helpful
to the better appreciation of the number of
facilities where betatron activities took
place. I don't think we really have a full
appreciation of that right now.

I do understand that there are
other facilities where betatron is used, and
the degree to which those facilities fall
within the scope of this program and perhaps
need to be looked at and included in dose
reconstructions at those other facilities, right?

So, from that regard, I don't know. Has anyone looked at, you know, the extent to which betatrons are fairly widespread or very limited?

DR. ANIGSTEIN: There is a list in -- Allis-Chalmers has -- in the Allis-Chalmers publications, of which I have some copies, of all the betatrons that were in place throughout the country at that time.

There weren't that many, and they were primarily -- there were more medical facilities, and I think it actually started out being used for medical, for radiation therapy, and then started being used for industrial radiography, but there weren't any on the list that I can recall -- I'm a little hesitant to say that, because I'm just going from memory.

MEMBER MUNN: And that's the real question, whether the other betatrons that
were in use were involved in this program in any way. Anything that is not really should not be a topic for --

DR. MAURO: I agree, but I just don't know, though.

DR. ANIGSTEIN: It's very uncommon.

DR. MCKEEL: Dr. Ziemer, may I comment? This is Dan McKeel.

CHAIRMAN ZIEMER: Certainly, Dr. McKeel.

DR. MCKEEL: Well, my comment is I would refer you to a previously classified document that we had unclassified by DOE at some great effort, LAMS 1064, which deals with non-destructive testing activities at the three largest DOE facilities, Los Alamos, Rocky Flats, and Oak Ridge.

In that document, it was quite clear that the people at Los Alamos had a non-destructive testing training program that was applied throughout the DOE complex, and, in fact, John Ramspott has entered in the serial
numbers of the betatrons that were in use at
Los Alamos.

His list also included Allis-Chalmers, which interestingly is a covered AWE site, and there are -- there are more on that list, and that's been entered into the record, and I'm sure John can resupply that information, but to say that this is only used at General Steel is just absolutely incorrect.

The other issue in LAMS 1064 and the point of my comment was we're not just talking about betatrons. We're talking about the class of particle accelerators.

We are also talking about non-destructive testing by gamma sources, and it was also very clear in LAMS 1064 that they were extensively used. Gamma sources I'm talking about now, cobalt, et cetera, at Oak Ridge and at Rocky Flats.

So, Mr. Ramspott and I, our perception is quite different, and we know from reading now about steel plants in general
that it would be an accurate statement to say that every single steel plant, and there are many such in this program, has to use non-destructive testing to examine steel parts, welds.

And, you know, if we had another lifetime to research that, we could easily turn up that information, but I'm talking about Simonds Saw and Steel. I'm talking about Bethlehem Steel. I'm talking about the other DOE sites not mentioned in LAMS 1064 like Fernald, et cetera.

So, I would say that this is a generic information. I would say that we have provided a lot of the information to certainly extend it beyond GSI and that that information we're asking, please go over it. We've presented that over time, and I believe that information needs to be incorporated into TBD-6000, because --

I'll just read you an example from the Weldon Spring Site Profile talking about
fuel tests. It says, "Uranium, like most metals, shrinks on solidifying, and blowholes and pipes are formed in the ingots," and then I've underlined this from Mr. Ramspott.

"The amount of metal to be removed by cropping in order to produce sound materials for rolling is determined by the use of high energy X-rays." It doesn't say gamma rays. It says X-rays.

"This test has supplemented other work in aiding the development of improved casting techniques. Uranium alloys may be cast in rounds or flats so that very little, if any, machining is required for use. Such bars may be tested by ultrasonic techniques for soundness."

So there are at least isotopic sources and particle accelerators that are widely used throughout the AWE and DOE complex for non-destructive testing.

CHAIRMAN ZIEMER: Okay. Thank you, Dan, and I think we've all agreed with that.
The question is whether or not a generic sort of coverage of those kinds of devices should be part of TBD-6000 or should be part of a separate document on non-destructive testing or something like that, so that's part of the issue.

The betatrons are certainly a very special way of doing it. The isotopic sources are a different way of doing that. There are other X-ray devices in the past that have been used. The old radium sources were used in the early days, so there's a variety of kinds of approaches to non-destructive testing.

We're certainly aware they're used in virtually all facilities, and, in addition, at least in modern days, there is even isotopic gauging devices used in some of these kinds of facilities, as well, which is not really non-destructive testing of the type we're talking about but is another possible use.

Dr. Mauro had another comment.
DR. MAURO: Yes, two aspects of that concern. One is the reason the non-destructive testing issue, you know, really came to the forefront, Appendix BB, is the lack of film badge data from '53 to '64 and issues surrounding that.

These other facilities that might use the betatron or any other type of X-ray device, radium source, if there is a comprehensive film badge program in place at the time, then it becomes certainly an issue of concern that needs to be reconstructed, but it becomes just another source of external radiation exposure that has to be properly dealt with through your dosimetry program.

Now, one of the things we did learn and will probably be the subject of the conversation is one of the difficult isotopes in the past has been radium 226, and the reason being is it wasn't -- it was used in non-destructive testing, but it wasn't regulated by the Nuclear Regulatory Commission.
or the Atomic Energy Commission at the time.

So we have, in our minds, some question about who had regulatory oversight in the early years when radium 226 was being used for non-destructive testing, and it seems to me that once the NRC licensed the source, there was a degree of oversight, not only film badges but a radiation protection program.

But in years -- let's say in the fifties, let's say, there was a facility such as -- I think we're going to be talking about this, where radium was the source. There's some question about, you know, adequate radiation protection, how do we know what the doses were, that sort of thing.

CHAIRMAN ZIEMER: Okay. Thank you for that comment. Any other --

MR. RAMSPOTT: Dr. Ziemer?

CHAIRMAN ZIEMER: Yes?

MR. RAMSPOTT: This is John Ramspott. May I make a comment on Dr. McKeel's remarks?
CHAIRMAN ZIEMER: Yes, John.

MR. RAMSPOTT: In listing the identification of Allis-Chalmers as the only manufacturer of betatrons or one of the main is actually incorrect. Betatrons were manufactured by General Electric. There is photographic proof of that in numerous articles that I found. Siemens.

There are multiple manufacturers of the betatron, so the betatrons were more widely used. The Allis-Chalmers betatrons were essentially 80 of them that we found.

CHAIRMAN ZIEMER: Yes.

MR. RAMSPOTT: I think that's a very big issue. Then another big thing about the badges that John's talking about now, the badge programs would definitely -- would possibly catch the betatron activity if they were also the badges that would pick up the neutron dose, because the betatrons, if I understood correctly, when they're running are creating neutrons, and if you don't have the
right badge -- like at GSI, even on the badge info we do have, you miss the neutrons, so not including that on every site that had one would probably be a mistake, too.

CHAIRMAN ZIEMER: Okay. Thank you.

MR. RAMSPOTT: Thank you.

CHAIRMAN ZIEMER: Well, so one of the issues on the revision of TBD-6000 is whether or not to include the non-destructive testing as part of that document or whether to handle it as a site-specific thing -- it could be done either way -- or whether a separate generic non-destructive testing document of some sort is needed.

I don't know at this point if we're in a position to answer the larger question on behalf of either the Board or the Agency. We certainly, in this particular instance, if we don't revise TBD-6000 to cover it, we have to address it specifically in the GSI document, and one could, of course, later develop a generic document to cover other
facilities in general or to establish some general principles.

You would still need site-specific addressing these things for particular cases, but maybe get some reaction here on what to do in this particular case, whether or not we want to ask NIOSH to consider revising TBD-6000 to cover this broadly.

I mean, there are certainly big differences between betatron for non-destructive testing and the radium source for non-destructive testing or an X-ray, a regular X-ray unit or whatever.

MEMBER MUNN: In the absence of concrete data with respect to each and every site that we might need to call to look upon, experientially those of us who have ever done any work in this know very clearly that non-destructive testing varies so widely from one site and from one application to another that it would seem to be very difficult to me to establish something like a generic pattern.
that one is expected to follow in a program like this.

It just would appear to be almost required as a site-specific matter, rather than a generic one. I don't see how you could -- you could build a life's work on identifying a generic kind of approach to such a varied set of sites.

CHAIRMAN ZIEMER: I suppose the generic approach would be one where you knew in general that they were doing non-destructive testing but lacked details on either the -- well, the types of sources or the frequencies, or you had to make some assumptions.

MEMBER MUNN: And the types of materials.

CHAIRMAN ZIEMER: Yes.

MEMBER MUNN: It's such a wide range.

CHAIRMAN ZIEMER: So it's a difficult problem.
DR. MAURO: But if you've got the
TLD film badge, I mean, because that's --

CHAIRMAN ZIEMER: Well, then, but
you don't always have that, particularly in
the early days, maybe. Jim, did you have some
thoughts on this?

DR. NETON: Well, it's a difficult
issue. I mean, for the most part, it seems
like the non-destructive testing is not going
to be normally related to DOE or the AEC
activities, although that doesn't get us
anywhere, because, as we know, IG-003 says
that all --

CHAIRMAN ZIEMER: Right.

DR. NETON: -- sources of exposure
to ionizing radiation need to be covered.

Where you have these sort of small
facilities or AWEs that process some uranium,
it may be true that there was non-destructive
testing, but if we have no evidence if that --
I'm not quite sure how we would address it,
although I do recall at one point the
Environmental Protection Agency actually went back and looked at distributions of exposure to various Classes of workers in the country by decade.

I'm aware of a pretty thick publication by -- I think it was a person named Kumazawa who generated the distribution. In general, I think we might be able to use that as a starting point, because I think radiographers would want an accounting of --

DR. MAURO: That 1984 report does ring a bell.

DR. NETON: I believe so, yes, and he went back. He was sort of a visiting scientist from Japan, worked for the EPA, generated a very, pretty comprehensive list of the distributions of exposures from various work categories.

Radiography stuck out, because I think it is probably the highest category of the workers he evaluated. There is some data there that could be used as a starting point.
In fact, I think we might have a document within our files that speaks to that. I'm not sure where else we would go. It certainly would need to be covered.

CHAIRMAN ZIEMER: Okay. Well, on issue 1, we've already agreed to the revision on the Putzier effect. It appears that the Work Group is suggesting that on non-destructive testing in this case that we address that within the parameters of the GSI document for that facility at the moment.

MR. ALLEN: It's been our experience in the individual appendices --

CHAIRMAN ZIEMER: Right.

MR. ALLEN: -- side by side if things become -- if we start seeing a generic type of pattern, then it would either be a revision to TBD-6000 or, like you said, a separate TIB --

CHAIRMAN ZIEMER: Right.

MR. ALLEN: -- document that we could reference.
CHAIRMAN ZIEMER: Right. So then the only other outstanding part of issue 1, then, deals with the document that SC&A generated for us to address the discussion we had on the use of assigning the highest deterministic value versus a value from the distribution. I'm trying to remember the exact details on that, but --

MR. ALLEN: TBD-6000 applies to distribution. To show that that was favorable, we pointed out the highest dose rate at Fernald --

(Simultaneous speaking.)

CHAIRMAN ZIEMER: Okay, but you were going to prepare something for us for today.

DR. MAURO: We did.

CHAIRMAN ZIEMER: And that was --

DR. MAURO: Well, the report, in fact, the report that I just re-sent is our evaluation.

CHAIRMAN ZIEMER: Oh, that was --
DR. MAURO: That's the -- that was done a while ago, and Bill Thurber is on the line. He was the principal author, and I guess the bottom line is that after carefully looking at the distributions that are in TBD-6000 for external exposure --

You know, our original concern was that when those distributions for external exposure were developed in TBD-6000 and the different categories of workers, no mention is made of the Putzier effect.

CHAIRMAN ZIEMER: Right.

DR. MAURO: And we knew that the Putzier effect occurs on occasion and does result in external exposures that could be on the order of 10 to 15 times higher than, let's just say, regular old uranium metal.

CHAIRMAN ZIEMER: Right.

DR. MAURO: And we raised that issue, and we had some discussions on that, but subsequent to that, David put together a White Paper which showed that the reality of
the situation is when you look at the actual values that were used in TBD-6000, the medians and the upper 95th percentile values for the different Classes of workers, they are very conservative.

And, Bill, you could speak to it, the specifics of it, but I recall even the median value for the machinist had external dose rates which were very high and more than sufficient to capture the fact that maybe there might be a Putzier effect, but if you could speak to that for a minute, I think maybe you could help us out a bit.

MR. THURBER: Okay. I think that the way the issue was left last time -- let me back up or remind everybody of what was done. As John said, David looked at the Fernald data, David Allen, and said, "Gee, the Fernald workers obviously were exposed to the Putzier effect."

So if I look at this huge data set we, NIOSH, have for Fernald of 120-some
thousand measurements, and I look at the maximum, that guy is obviously going to have experienced any consequences of the Putzier effect, and so that's what NIOSH did.

Then the discussion really focused on -- it was kind of statistical, if you will, focusing on whether the Fernald maximum was less than, greater to, or equal to the full distribution from TBD-6000, that is, the median plus the assumed geometric standard deviation of five.

It clearly was less than the 95th percentile, but NIOSH indicated that their preferred approach in this case was to use the full distribution, and so at the time it was not absolutely clear where the full distribution sat relative to the Fernald maximum, and we provided some information on that in our paper of December 30, the non-PA cleared version of the White Paper.

And subsequently we did a couple more modeling calculations, because if you --
there were some situations where it wasn't clear whether the Fernald maximum or the full distribution from TBD-6000 was limiting, and on the basis of a couple of additional calculations of hypothetical POCs, we convinced our -- and those two cases were in a side memo. They were not part of the White Paper.

But, anyway, the bottom line is that we have convinced ourselves that the Fernald max -- that the TBD-6000 full distribution is more conservative than using the Fernald maximum, so we think that is a sound approach.

CHAIRMAN ZIEMER: Okay. Thank you. Well, it appears to me, then, that we're ready to close issue 1 with the understanding that the revisions dealing with the Putzier effect would be included in it and that dealing with the specifics of the non-destructive testing for General Steel would be addressed in our handling of Appendix BB and
the related Petition Evaluation.

Is that -- Work Group members, are you agreed on that? Mark, do you have a comment?

MEMBER GRIFFON: I mean, can you just -- I'm just trying to find the original copy of TBD-6000. Can you remind me what the distribution was based on in TBD-6000 on this?

MR. ALLEN: It was a model distribution based on dose rates from different sites.

MEMBER GRIFFON: So it was modeled data, not -- so we're not relying on Fernald surrogate. This was just a comparison we were doing.

MR. ALLEN: A comparison that basically if we relied on surrogate data from Fernald, it would be lower.

MEMBER GRIFFON: Right.

MR. ALLEN: The model --

CHAIRMAN ZIEMER: The model is more conservative than the Fernald maximum.
MEMBER GRIFFON: Because one thing I get concerned about with that, and Jim will reflect back to last week's meetings, is that I think Fernald is still looking at the question of the data at Fernald.

So if you're relying on comparing against the data at Fernald, the Fernald Work Group is still looking at that question of data, you know, validity for the SEC review for Fernald. So, you know --

MR. ALLEN: To put some words in John's mouth here, it's his White Paper, they also looked at Mallinckrodt and ElectroMet, or Bill Thurber, I think, did.

MR. THURBER: Yes.

CHAIRMAN ZIEMER: Not just Fernald data but other data around the site for the same effect. Are you okay with that?

MEMBER GRIFFON: And the only other -- yes. The only other question I have is how does this get at the question of hand doses or those kind of issues? I don't know if that's
covered in issue 1.

DR. MAURO: Bill, you looked at that.

MR. THURBER: Yes. We looked at doses to the hands and arms. We looked at doses to the rest of the skin, and we looked at the whole body doses and did the kind of comparison I talked about where we examined whether the Fernald maximum was more or less conservative than using the TBD-6000 full distribution, and we found that in each case that the TBD-6000 full distribution was more conservative, more claimant-favorable.

MEMBER GRIFFON: Okay, but just to go back one step, do you think the -- you said one is more or less conservative than the other. I'm asking the question of whether you think it's a scientifically, you know, robust approach for estimating the dose.

You know, taking it back one step to look at the 6000 model, is that dose adequate to reconstruct those extremity doses,
you know? I mean, you said one is a more conservative approach than the other one. I'm not asking that question.

I'm asking is the model in TBD-6000 adequate for estimating doses to extremities? Does that make sense? I'm not sure --

DR. ALLEN: I'm not sure I understand your point.

MEMBER GRIFFON: Well, I'm asking --

DR. MAURO: I'm trying to think of the original source and models and data.

MEMBER GRIFFON: And part of it is I'm trying to remember where this came from.

DR. MAURO: And I don't remember where --

CHAIRMAN ZIEMER: Yes, let me see if I can clarify the question. I think Mark is asking how, as a starting point, how do you determine what the hand and skin doses were based either on source term or film badge
data, I guess, is what you're asking.

MEMBER GRIFFON: Yes.

CHAIRMAN ZIEMER: Or what -- whatever --

MEMBER GRIFFON: Yes, I mean, how do you -- I'm trying to -- I brought -- I didn't bring every document I needed.

CHAIRMAN ZIEMER: How did you -- how did you reconstruct extremity doses?

MEMBER GRIFFON: Right. How does -- what's NIOSH's approach for using that distribution of data? I'm assuming that -- well, I don't want to assume anything. Did you model the whole body exposure from these various geometries? Is that how you came up with this distribution?

MR. ALLEN: We did it for all three. We modeled --

MEMBER GRIFFON: Okay.

MR. ALLEN: -- whole-body photon, skin of the whole body, and hands and forearms.
MEMBER GRIFFON: Okay. So you have three different distributions.

MR. ALLEN: Three different, yes.

MEMBER GRIFFON: Okay. Okay. That answers my question. I was trying to remember.

CHAIRMAN ZIEMER: We've gone through that in the past, but you were a little fuzzy on it.

MEMBER GRIFFON: Yes. Okay, and SC&A is saying you looked at all, each different distribution --

DR. MAURO: Yes, we looked at -- yes, we did that. What I have to say is that, and I was trying to reach into my memory, is that originally when you did TBD-6000, what was the original data or models that we used, and I know that in some cases --

I might be confounding 6001 with 6000. Some were models, physics models, and others were data that you looked at a broad range of operating facilities, and I've got to
say I don't quite remember what the -- what the --

MR. ALLEN: Well, I'm getting things mixed up, too, John, but if I remember right, 6000 was all model, and 6001 --

DR. MAURO: And 6001 was data.

MR. ALLEN: -- included some data, yes. Okay.

MEMBER GRIFFON: And the last question -- I think I'm -- I'm just trying to refresh my memory before we close something out, but did this include -- all this is modeled for 6000 you're saying.

MR. ALLEN: If I remember right.

MEMBER GRIFFON: Okay.

MR. ALLEN: The vast majority is. I'm pretty sure it's all --

MEMBER GRIFFON: Because I'm curious if the -- I mean, the Putzier effect, I vaguely remember some measure data, you know, near these, and I wonder whether that was compared with the modeling exposure rates
and stuff that you had. Was that compared in any way?

DR. MAURO: Well, what we compared was the Putzier data, which says 15 times higher.

MEMBER GRIFFON: The Putzier data is actually measured data, right?

DR. MAURO: Yes, and they measured.

MEMBER GRIFFON: Okay.

DR. MAURO: They measured numbers.

MEMBER GRIFFON: And you're saying --

DR. MAURO: And then we looked at their distribution to see whether or not their distribution was claimant-favorable that they used in TBD-6000. Well, that's the question right now is how did you get your distribution? Was it -- how much did it depend on models? How much did it depend on empirical data? And I just don't remember.

MEMBER GRIFFON: All right. I'd like to -- maybe at a break we can -- I can
find the document.

MEMBER BEACH: Well, isn't that in your White Paper?

DR. MAURO: Yes.

MEMBER BEACH: I'm looking at page 7 of 18 --

DR. MAURO: Go ahead.

MEMBER BEACH: -- which talks about exposure dose estimation, and it's talking about contact with uranium and the atoms, and I'm wondering if that's the model that you were looking for, Mark.

MEMBER GRIFFON: It might be.

MEMBER BEACH: On page 7 of 18.

CHAIRMAN ZIEMER: Is that on the January --

MEMBER BEACH: On the December 30.

CHAIRMAN ZIEMER: December.

DR. MAURO: Yes, but it should be the description of what is in TBD-6000.

CHAIRMAN ZIEMER: Oh, yes.

MEMBER BEACH: It's the TBD-6000
DR. MAURO: Yes.

MEMBER GRIFFON: Maybe -- I think we're ready to close it out. I'm just not ready to vote. If we could just go over it at the break --

CHAIRMAN ZIEMER: Sure.

MEMBER GRIFFON: That would be fine. Make sure of what I'm looking at, but, yes, I think it --

CHAIRMAN ZIEMER: We can do that. I want to move us along. We're going to -- we'll come back after the break.

MEMBER BEACH: John's got --

MEMBER GRIFFON: One last thing --

CHAIRMAN ZIEMER: We're not going to take a break yet, so it's -- another question, Mark?

MEMBER GRIFFON: One last question on the Putzier data, I guess. Was that -- did you -- you compared Fernald data to this TBD-6000 part. You didn't necessarily compare
Putzier numbers. You just know that that same effect would have taken place at Fernald, right?

DR. MAURO: I just want to back up a little bit.

MEMBER GRIFFON: Go ahead.

DR. MAURO: The reason TBD-6000 is so high -- you know, how did they -- how come they come up with distributions of doses, annual doses to skin, forearm, whole body that was high enough to capture Putzier effect? Well, the answer was simple.

They went with the generic external exposure from naked metal, which is about 200 mR per hour in a foot, but they assumed an enormous occupancy time. In other words, so what happens is the annual dose that you get in TBD-6000 is based on two assumptions, no Putzier effect.

Well, what they do is they say, But we're going to say that the person is present close to this metal for a long -- many
hours, 1,000 hours a year, some extraordinarily long period of time, which is very conservative. So what happens is you end up with an annual dose, the hands, forearm, whole body, which captures the fact that you're assuming that exposure.

Now, the reality of the situation is people don't spend that much time that close, and even if there was a Putzier effect, it would be accounted for, and that's why it just so happens that even the highest values observed at Fernald were within the reasonable boundaries of TBD-6000, because the reality is that people don't spend that much time.

So, in a way, you got lucky. What I mean by that is you ended up using -- end up using --

MEMBER GRIFFON: Well, you put a high number on it.

DR. MAURO: Well, no. No, no.

MEMBER GRIFFON: I'm more concerned about it now than I was before you made those
statements.

DR. MAURO: No, no, no, no. Let me say, listen, we don't know the occupancy data. I mean, really, what I'm saying, for better or worse. We see how -- we know how it happened. We know that they started with the physics of the problem.

We know what the radiation field is in contact and at a distance from a slab of natural uranium, and we can come up with an annual dose based on -- a distribution based on how much time a person spends close to it, and they adopted some very conservative assumptions to make sure that they were claimant-favorable for the default values for TBD-6000. They were so conservative that they actually enveloped the highest exposures.

MEMBER GRIFFON: I was of the impression that they actually modeled the ingots as they would appear with the Putzier effect, but they didn't do that.

CHAIRMAN ZIEMER: No, NIOSH told
us. NIOSH told us at the last meeting --

MEMBER GRIFFON: You just made a -- you put a high number.

CHAIRMAN ZIEMER: No, no. They told us at the last meeting that the calculation was not based on the Putzier effect but that it --

MEMBER GRIFFON: No, I'm not saying they're contradictory. It's my memory. It's not -- yes.

CHAIRMAN ZIEMER: In fact, that's specifically in the transcript from last time that exactly what you said, John, that the --

MEMBER GRIFFON: I guess it's the hands, forearm --

CHAIRMAN ZIEMER: -- approach used was sufficiently conservative to cover the Putzier effect even if it was present.

MR. THURBER: This is Bill Thurber. Just to confirm what John said, what they specifically assumed in TBD-6000, an operator spent half of his time with his hands in
MEMBER GRIFFON: In contact. Okay.

MR. THURBER: -- with this large mass of uranium, 50 percent of his time, and that's why it was so conservative.

CHAIRMAN ZIEMER: Yes, and I guess the alternative would be to find that more realistic time and then calculate the Putzier.

DR. MAURO: And calculate Putzier, right.

CHAIRMAN ZIEMER: And you might end up at the same place. In one sense, it was sort of fortuitous that it worked out that way, because the assumptions appear to be unrealistic in terms of reality, in terms of what a worker would actually do.

MEMBER GRIFFON: That's something that I'd like to, even in a break, just do a back-of-the-envelope, because I think the dose rates from the Putzier effect are so much higher.

DR. MAURO: Fifteen. Fifteen-fold.
MEMBER GRIFFON: Yes.

DR. MAURO: In other words --

MEMBER GRIFFON: So you can break out the time. I mean, if you're there for an hour handling, it's not -- it's a less conservative approach.

DR. MAURO: Well, and it --

MEMBER GRIFFON: I'd have to look at the numbers, but just for the extremity doses. I'm not saying for the overall.

DR. NETON: It's source-term model, essentially, and apparently we've gone out and validated against real data. I mean, I don't know what more you can do than that. It's bounded. It bounds the real data that's out there. What's the issue here?

MEMBER GRIFFON: Well, that's what I'm questioning is whether it --

DR. NETON: You just heard him say that. They compared it at Fernald, they compare it to Mallinckrodt. You compare it to other facilities, and it bounds the real world
data.

MEMBER GRIFFON: And then you have the question of the Fernald data, but especially extremity data at Fernald. I don't know whether it exists for the extremity doses at Fernald, but maybe it's there.

DR. NETON: I can't comment on all data, but --

MEMBER GRIFFON: Yes, but, anyway, I would just want to -- you know, you're saying 50 percent of the time -- was it 50 percent of the time with hands in contact? I mean it's probably -- yes, it's probably -- how does that --

This is something I can do at the break with, you know, someone's help on the back of the envelope, the dose rates from the Putzier sort of ingot versus a -- your model just assumes uranium metal, right?

MR. ALLEN: Right.

MEMBER GRIFFON: So you have dose rates at each. You have residency times with
their hands in contact at each. You know, it's a simple little calculation to see if one is more -- you know, I'm --

CHAIRMAN ZIEMER: Well, one -- you know, you can always postulate different times and come up with different numbers, but I think --

MEMBER GRIFFON: Well, that's what they just did. They postulated occupancy times.

CHAIRMAN ZIEMER: But the bottom line is comparing it with real world data.

MEMBER GRIFFON: But I -- yes. I mean, not to be completely cynical about this, but I can look at Fernald data and say, okay, how much occupancy time do I need to put in my model to make it bounding as the Fernald data? I mean, that's a, you know, a very simple thing.

Again, I'm not -- I'm going back mainly to the extremity situation. That's the one concern.
CHAIRMAN ZIEMER: John?

MEMBER GRIFFON: Because that's what they always bring up with us. That's why the Putzier stuff got brought out in the first place.

DR. MAURO: I mean, the highest number we're seeing may be the result of the person who does handle it for long periods of time, but is he wearing gloves, and a lot of the beta was attenuated. I don't know.

MEMBER GRIFFON: True. True. That's another factor.

CHAIRMAN ZIEMER: Okay. So --

MEMBER GRIFFON: I'm close to agreeing, but --

DR. MAURO: Bill, it sounded like you wanted to say something.

MR. THURBER: Yes, I wanted to clarify one point for everyone. With regard to the extremities dose, Fernald did not measure that, so the Fernald maximum did not involve an extremities dose to the hands and
arms. They did have data to the general surface of the body but not to the hands and arms.

What we did to come up with a comparable figure is that we used a multiplier, which we documented the source of in the December White Paper, to come up with what we felt was a reasonable estimate of the exposure to the hands and arms.

MEMBER GRIFFON: What do you mean, a multiplier?

MR. THURBER: Well, it was a multiplier based on measurements that had been made comparing the measurements from a film badge to the expected dose to other parts of the body.

CHAIRMAN ZIEMER: I assume that's a geometric --

MEMBER GRIFFON: That's something NIOSH has done before, yes, sort of correcting for different -- anyway --

CHAIRMAN ZIEMER: Okay. So we'll
revisit this briefly after the break. I believe on the TBD-6000 Issue Matrix, John, I'm looking at your summary. We skipped to issue 5 was the open one last time.

DR. MAURO: Yes.

CHAIRMAN ZIEMER: Issue 2 was in abeyance.

DR. MAURO: Well, issue 2 is simply a table that they need to put in the report.

CHAIRMAN ZIEMER: Right, which will appear in the revision. Issue 3 was closed. Issue 4 was closed or resolved. This is all previous.

DR. MAURO: Yes.

CHAIRMAN ZIEMER: On Issue 5, we closed that last time.

DR. MAURO: Yes.

CHAIRMAN ZIEMER: On issue 6, we transferred that to the Procedures Review Subcommittee, and that has been officially transferred, and that is the one, I believe, dealing with the resuspension factors.
DR. MAURO: Yes.

CHAIRMAN ZIEMER: And the net result of this is that we're not going to be able to -- well, I guess we'll be able to close TBD-6000, because this will move out of that. This becomes a system-wide factor, not a TBD-6000, so whatever the suspension factor models are that NIOSH will use overall will apply in this case and in other cases.

So that's not TBD-6000 specific any longer, and that is being addressed by the Procedures Work Group, and then that, in fact, will close out TBD-6000 if we are able to close this first item, and then we will be in a position to proceed with the revision.

DR. ALLEN: Yes. I don't know if it's closed out or held in abeyance, whatever the terminology is.

CHAIRMAN ZIEMER: Well --

DR. ALLEN: There's some held in abeyance.

CHAIRMAN ZIEMER: The abeyance one
was Issue 2, but that simply means once you do
that, it's closed. It's in abeyance just to
assure ourselves that it gets done.

MEMBER BEACH: Well, issue 1 is
actually in abeyance, also, according to my
notes.

CHAIRMAN ZIEMER: Well, in a sense,
that's correct, because -- but we still have
this other question on --

MEMBER BEACH: Right.

CHAIRMAN ZIEMER: -- on that model.
Yes, it was in abeyance in terms of the
revision that was promised, but we have that
open question.

MEMBER BEACH: Did you mention
seven?

DR. MAURO: That's the last line
you added.

MEMBER BEACH: Okay.

MEMBER POSTON: We haven't gotten
to seven yet.

CHAIRMAN ZIEMER: Let's see. I
guess I didn't mention seven. Seven was closed at one point.

DR. MAURO: Yes, I'm the trouble-maker on seven, okay. I'll give you the fly in the ointment.

CHAIRMAN ZIEMER: I didn't have -- did we not discuss that at the last meeting?

DR. MAURO: We did. We had quite a bit of discussion, and I left it at one place where -- you see, I think the arguments Jim and John Poston made during the meeting we completely accept regarding the way -- what I call the point two rule that you folks use, point two.

Whatever the air concentration is in milligrams per cubic meter, the amount of uranium a person might ingest. You multiply the air concentration in milligrams per cubic meter, 5.2, and then you get milligrams per day ingested, okay.

Now, the outcome of that, for all intents and purposes, if it's a fairly high
concentration, like 100 MAC, we're dealing with a fairly high. You're going to get what I, from my experience, from reading the literature, a fairly high ingestion rate, 20 milligrams per day.

As far as I'm concerned, when you're talking in multiple milligrams per day as being the ingestion rate, that's compatible with the literature that's been published by others, NCRP and EPA. But then I run into -- and then, also, so I'm okay there when you're dealing --

You end up with a number when you're dealing with very high dust levels, but when you're dealing with very low dust levels, not low-low but, you know, one MAC, all of a sudden you're down to a fraction, a small fraction of a milligram per day as your ingestion rate, and the argument made that that's okay, and I accept this.

The reality is in most circumstances, whenever there is soot on the
ground and it's comingled with perhaps some uranium that might be associated with some operations, when you're inadvertently ingesting that material, it's not all uranium.

CHAIRMAN ZIEMER: No.

DR. MAURO: Only a fraction of it is uranium, and, as a result of that, the fact that you end up with .2 milligrams per day of uranium under those circumstances being ingested, you know, heuristically you say that's fair.

But the one place I don't think it's fair, and that's what I mean by the fly in the ointment, is if you've got a site where you have thick layers of pure uranium oxide sitting on surfaces at one of these old AWE facilities where it's not a mixture of steel and soot and junk, it's uranium, I have a problem with the .2 milligrams per day, and in those circumstances I feel that the ICRP and EPA number of 50 milligrams per day makes more sense, and that's where I come out on that.
So, yes, everything is fine except when you've got a site where you know they've happened in the past where you actually could see material, and it's uranium, and it's being kicked around, Simonds Saw, Bethlehem Steel, some of these old mill operations where the accumulation of uranium is apparent on surfaces, and it is uranium.

It's not a lot of other soot. Then I feel as if that you can't walk away from the EPA and NCRP 50 to 100 milligram per day number.

CHAIRMAN ZIEMER: Okay. Comments? NIOSH?

MR. ALLEN: Just a clarification. You're talking about a lot of material laying on the floor being kicked around that's not causing airborne?

DR. MAURO: Well, I'm saying that the hand -- the hand-to-mouth action, okay, I have accepted the fact that when there is a lot of material, soot, dirt, you're in a dirty
attic, you're in a dirty workplace.

I accept the work done by EPA and NCRP summarizing the literature. They're not talking radioactivity. They're talking soot.

How much of this material has been inadvertently ingested? And the number that comes up in those two places is 50 to 100 milligrams per day is what's being inadvertently ingested, just through inadvertent hand-to-mouth movement.

Now, the argument that you folks are making is, well, it's not like that at a uranium plant where all the material that's involved in hand-to-mouth transfer is all uranium. It's mostly just other soot, and a little bit of uranium might be mixed in, and under those circumstances I can see why you would not be very comfortable using such a large number as 50 milligrams per day.

But there are circumstances at sites where we've read where there was a lot of accumulated uranium on surfaces where just
about 100 percent of the material that was sitting on surfaces, it was, in fact, uranium, and in those circumstances I don't think you get this dilution effect, and all of a sudden, the 50 to 100 milligrams per day seems to be more claimant-favorable and appropriate to be used.

MEMBER POSTON: John, I hate to interrupt you, but --

DR. MAURO: Yes.

MEMBER POSTON: -- two questions real quick. Give me an example of repetitive hand-to-mouth that you would expect in a uranium -- I mean, what are you talking about?

DR. MAURO: Well, apparently, you know, when a person is -- when you look into the literature on this -- Scott Calabrese wrote some work and a lot of people -- it is not unusual for various reasons, whether they're smoking, they're eating, or just habitual movement, you pick your hand, you put it to your mouth, and you take in small
amounts.

Now, you know, we're talking milligrams, so it's not a -- it's not a lot of mass, but the data show there are some -- Jim, you made some very good points about, well, there are some aspects of that data that you're not too comfortable with, but at the same time, I find it hard to walk away from what the EPA and NCRP says.

MEMBER POSTON: Most of the facilities that I've ever been in don't allow eating, so, now, you could postulate that people were unsanitary and went into the clean area to eat their lunch and didn't wash their hands and so forth, but I'm not aware of any kind of hand-to-mouth kinds of stuff that you're talking about. Secondly, I'd like to know -- remind me what NCRP document you're talking about.

DR. MAURO: Oh, the number?

MEMBER POSTON: Yes.

DR. MAURO: It might be -- it might
be 123. I'm not sure.

MEMBER POSTON: You don't know.


MEMBER POSTON: I'm not asking about that.

DR. MAURO: I think it's NCRP 123, where it had the generic models. They have a bunch of generic models on how to model pathways. I believe it's 123, where they talk about inadvertent ingestion as what is your default value for if you want to model the ingestion. I know I'm taking a shot at it.

MEMBER BEACH: To make a comment on John's comment, in the early days, even as close as the late eighties, we were smoking, drinking back in the -- back in the zone, so -

MEMBER POSTON: You were in violation of the rules, then.

MEMBER BEACH: Actually --

MEMBER POSTON: I've been working
since '57, and we --

MEMBER BEACH: Well, I'm saying it was practiced.

MEMBER POSTON: We always had no, you know, rules against smoking and eating and drinking, and you had to leave the areas. In some cases, you had to wash.

MEMBER BEACH: Whether, it was a violation or not, it was being done.

CHAIRMAN ZIEMER: Only in areas that were non-decontaminated or just restricted areas?

MEMBER BEACH: You would go from a contaminated area right into a control room and smoke, drink, do whatever.

DR. ANIGSTEIN: Also, at GSI, the workers testified that they ate their lunch right there. They only had 20 minutes for lunch. They ate their lunch right in the betatron room sometimes, which is where uranium was also handled.

CHAIRMAN ZIEMER: Yes, but I think
John is talking about places where they're machining uranium.

DR. MAURO: Yes.

CHAIRMAN ZIEMER: And, I mean, GSI is not a place that would have machined uranium. It's not a GSI issue.

DR. MAURO: Exactly.

CHAIRMAN ZIEMER: It's an issue of TBD-6000 and places that would be machining or extruding --

DR. MAURO: Which goes way back. It goes back to the fifties.

DR. NETON: NIOSH doesn't dispute ingestion occurring in the workplace. We can just say, you know --

CHAIRMAN ZIEMER: Right. It's more -- it gets down to the extent to which you would have the pure uranium in big layers versus --

DR. MAURO: Right. Exactly.

CHAIRMAN ZIEMER: And that, in a sense, could only occur if uranium is the only
thing they're machining so that you had, you know, they're machining no other metals to dilute that, so it's machining only uranium, and I guess we'd be talking -- it probably is uranium oxide.

DR. MAURO: That's what ends up on the floor. That's what ends up on the floor.

DR. NETON: I understand John's issue here.

CHAIRMAN ZIEMER: So the extent to which whatever is there is pure, and I guess you could hypothesize if they're handling a lot of uranium it would be a pretty high percentage, maybe, and the extent to which in a place that's known to be contaminated to that extent, in fact, would they -- I don't know. It's a --

DR. MAURO: My world in the last two years has been AWEs.

CHAIRMAN ZIEMER: Yes, Jim?

DR. MAURO: I'm sorry.

DR. NETON: I was just going to say
it seems to me that your argument is that, you know, you can generate this blanket, if you want to call it that, of uranium on the ground that is fairly highly concentrated or contaminated, but it also seems to me that in those situations you would have airborne generation of a fairly high magnitude concentration. If you get that kind of contamination on the ground --

DR. MAURO: Yes.

DR. NETON: -- you need to generate a fairly high airborne.

DR. MAURO: I did all that.

DR. NETON: And I think you said at the very beginning you had no problem with the high airborne, assigning that ingestion.

DR. MAURO: Yes.

DR. NETON: So I'm not sure that this -- you know, the only real --

DR. MAURO: In practice, you're saying it may not happen.

DR. NETON: In practice, can you
have these giant universally contaminated
blankets of uranium on the ground when you
have a very low airborne concentration?

    DR. MAURO: That's true.

    DR. NETON: I would suggest that
you can't.

    DR. MAURO: That's a good point.

    DR. NETON: I mean, so --

    DR. MAURO: So it becomes a moot
point.

    DR. NETON: So it almost sort of
cancels out, you know. This little blanket
that lies on the ground is what's available
for immediately ingesting.

    DR. MAURO: And if the blanket's
there, you've got to have 100 MAC. If you've
got 100 MAC, it's 20 milligrams per day.

    DR. NETON: Exactly. I think it's
sort of a self-correcting problem.

    DR. ANIGSTEIN: My problem with
this is that the two are not necessarily
related. We're assuming a one-to-one
relationship, assuming that there is a linear relationship between the air concentration and the amount of stuff on the ground, and --

CHAIRMAN ZIEMER: I'm not sure we have.

(Simultaneous speaking.)

DR. ANIGSTEIN: But the model, that's what the NIOSH model does. It takes the air concentration. It multiplies it by a factor, and that's your ingestion rate, and the ingestion is not purely from the air, so the two are separate issues.

You can have stuff on the ground without having a high air concentration, and you can presume -- well, the other way around -- I'm sure you could have.

So scientifically it's just not a valid connection. It may fortuitously work out sometimes. Well, yes, sometimes. Often, it's right, but --

DR. NETON: Well, we value the data. There is a graph that we've shown you
that shows an approximate linear concentration, and it makes some sense.

Intuitively, the higher the airborne you generate, the greater the surface contamination would be on the ground. That's the primary mechanism for contaminating a widespread area. I think that's --

DR. MAURO: That was another issue that we discussed that we made a complete reversal. We agreed with your --

DR. NETON: And we're not suggesting -- we're not -- if we had surface contamination information, we would certainly use it. I mean, this would not -- this is an approach to be used when you have nothing, but we demonstrated, at least empirically, that it seems to hold in -- at least in limited numbers.

And, again, it all started with us not accepting that fact that a person could ingest 100 milligrams of uranium if you have almost zero air concentration, and that was
SC&A's original starting point. I think we've come around on that.

   DR. MAURO: I think so, too. I'm not -- I guess, for whatever it's worth, are there circumstances where you could have heavy contamination of uranium oxide on surfaces, not very heavy dust loadings on the --

   One hundred MAC -- 100 MAC's a lot of dust. In fact, that's about as high as you could get. If you have circumstances like that, I would use the 50 milligrams per day. I wouldn't go with .2 times the air concentration.

   Let's say -- let's say the situation was we've got one MAC in the air, but you also note from talking to workers or whatever that, yes, there was a lot of activity on the surfaces. You know, it was there, and then I say to myself, what do I do now? I would use the one MAC for my inhalation, but I would use 50 milligrams per day for my ingestion.
MR. ALLEN: Yes, it's the same argument. Basically, you're saying there's got to be a place that works almost entirely with uranium.

DR. MAURO: Yes.

MR. ALLEN: You get a high concentration of uranium.

DR. MAURO: Absolutely. It would be --

MR. ALLEN: Housekeeping is so bad, you get a thick layer on the ground, but somehow with that situation you get no airborne. That's the --

DR. NETON: That's the issue, and I'd be totally willing to put in some provisos in this document that says one needs to evaluate for certain circumstances --

DR. MAURO: Be cautious.

DR. NETON: In many cases, I think many of the AWEs were very short duration projects. These were not like -- Simonds Saw was a long duration production operation, and
we actually had surface contamination.

DR. MAURO: And you did have 100 MAC.

DR. NETON: Yes, we had 100 MAC, and Bethlehem Steel we had surface contamination measurements, but these small Atomic Weapons Employers that did a small amount of work, a short duration, I think the model is fairly reasonable.

DR. MAURO: I think, perhaps, in practice I would agree with you. How many times are you going to run into this? I have to say that I am sort of stuck. You know, my world, I was so used to working with this 100 and this 50 milligram per day number for all my dose calculations.

It goes back 30 years, and now all of a sudden to walk into .2 micrograms per day as being ingestion, it just rubs me the wrong way, and I'm looking for a place where we could compromise and say what's reasonable within the milieu that we're working in.
And it seems to me that if a circumstance of the type I just described comes up, I think we have -- the right thing to do is we go with that high ingestion rate, but that circumstance may not arise. I don't know.

MEMBER MUNN: It's just difficult. It's just difficult to assume circumstances where there is a high surface concentration, but the level of physical activity in the area is so low that your air concentration is low.

CHAIRMAN ZIEMER: Well, you're thinking about resuspension, but to get the surface concentration to start with, you have to have generated an aerosol that's going to settle down.

MEMBER MUNN: Yes, that's true.

CHAIRMAN ZIEMER: I think that's what Jim is talking about is that --

MEMBER MUNN: Yes, he's --

CHAIRMAN ZIEMER: So there's an aerosol to start with, and you would have
ingestion from that, because we're assuming no
protection --

MEMBER MUNN: No.

CHAIRMAN ZIEMER: -- anyway, to
start with in a situation where there is
obviously almost visible dust.

DR. NETON: Right. Right.

MEMBER MUNN: When that's not the
case, when that's -- when you have a low air
concentration, then how could you --

CHAIRMAN ZIEMER: Well, Jim, you're
talking here or suggesting a caveat that would
address unusual situations where if it became
clear that you had a situation such as John
described that you would do something. I'm
not sure what it is you would do. I mean, you
don't even know that. You're only using this
as a default when you don't have either urine
samples or air samples or something.

DR. MAURO: Right.

CHAIRMAN ZIEMER: So it's a
default, so how do you even know you have this
situation to start with, the one you described?

DR. NETON: Interviews from workers, possibly. I don't know.

CHAIRMAN ZIEMER: But workers don't necessarily -- and if there is no rad protection program, who knows what those concentrations were? I mean, the fact that things are coated, unless you have source terms that say, you know, they only work with uranium and so on, and so therefore we're going to assume that it's as you described.

It's pure -- you know, workers describe that everything is coated with this stuff, and you say, oh, by the way, the only thing they were machining was uranium. So we have this situation. Now what do we do?

MEMBER BEACH: Do we have any examples of facilities that we would have it occur?

DR. NETON: In our approach, I think we would assume or try to estimate some
level of surface contamination as existed, whether it's 100,000 --

CHAIRMAN ZIEMER: That would give that.

DR. NETON: It would give you --

CHAIRMAN ZIEMER: And you could calculate an intake.

DR. NETON: And we're sort of at a disagreement between how many square meters of surface a person ingests per hour or per day. I mean, there are EPA models, and the EPA model that we've adopted uses a smaller surface area of aerial ingestion than I think what SC&A was reporting.

DR. MAURO: Yes, there were two.

DR. NETON: There's two.

DR. MAURO: One is the low. One is the high.

DR. NETON: One's low, and one's high.

DR. MAURO: That was Charlie Yu's work.
DR. NETON: Yes. How much -- it essentially comes down to how much surface contamination is there and how much of that surface contamination does one ingest per hour or per unit time. Those are the two, only two values you really need.

CHAIRMAN ZIEMER: And their assumptions on the ingestion, you're talking about oral.

DR. MAURO: Oral, yes. You just have to swallow a part. You know, it was brought up, and so this person --

CHAIRMAN ZIEMER: Yes, and why are those -- why are there those two discrepancies, I mean, or do they assume like -- is it like heavy work and light work, or is it like smokers and non-smokers?

DR. MAURO: That's the way -- I remember Charlie Yu has a little writeup in one of the -- one of the documents he wrote for the NRC, and he decided to break the world into two categories, one where the things are
relatively clean and the amount of inadvertent ingestion would be relatively small and other places where things could be pretty bad, and the point, the low number that you use you went with that distribution.

DR. NETON: Well, I wouldn't characterize it that way. I think he came up with some intake estimates that appeared to him to be fairly implausible given the larger surface area ingestion. We can go revisit that.

MEMBER GRIFFON: I think it sounds like --

DR. NETON: We're getting into the weeds here on this, but I'd like to point out, though, this is not -- this is -- this is a TIB-0009 issue. This is not a TBA-6000 issue.

DR. MAURO: That's true, too. That's true, too. This is TIB-0009.

DR. NETON: I mean, so this is outside the scope of this.

DR. MAURO: If you want to -- if
you want punt this to TIB-0009 --

DR. NETON: It's in TIB-0009. I mean, this is --

MEMBER GRIFFON: It's still an ongoing decision there.

CHAIRMAN ZIEMER: This is being covered in TIB-0009?

DR. MAURO: Absolutely.

DR. NETON: This is the TIB-0009 approach.

DR. MAURO: This is TIB-0009.

MR. ALLEN: And TBD-6000 just says to use TIB-0009.

(Simultaneous speaking.)

DR. MAURO: To use TIB-0009. Why didn't you tell me that a half hour ago?

CHAIRMAN ZIEMER: I'm thinking that, actually, we discovered that before, and that may be why we didn't have it. Do we need to officially transfer this to TIB-0009, I mean, to --

DR. MAURO: Procedures.
CHAIRMAN ZIEMER: Procedures? If it's being covered there, anyway --

DR. NETON: It's already there.

MEMBER POSTON: Hey, John, 123 is not appropriate.

CHAIRMAN ZIEMER: Well, this matter of keeping it open --

MEMBER POSTON: No, it's the right one. It's not appropriate, though. 123 is models. It's screening models for releases to the environment.

DR. MAURO: It is environment, oh, yes. Yes, it's not --

MEMBER POSTON: -- inadvertent workplace. These are just -- these are just rough estimates of --

DR. MAURO: Oh, yes.

MEMBER POSTON: -- screening models or yes, go or no go kinds of constructions.

DR. MAURO: Yes.

MEMBER POSTON: So I'm not sure that what you're --
DR. MAURO: Is that -- yes, and they come up with --

MEMBER POSTON: I'm not sure that's appropriate. I don't know that you can --

DR. MAURO: Well, it's an inadvertent ingestion.

MEMBER POSTON: I don't think 123 is appropriate for what you're doing.

DR. MAURO: Okay.

CHAIRMAN ZIEMER: Well, in any event, if this is a TIB-0009 issue -- then I believe that we're going to show this as being connected to the TIB-0009 or transferred to Procedures and not a TBD-6000 only issue. Bob, you have a --

DR. ANIGSTEIN: The reason -- the reason we brought it up and the others -- John brought it up. I brought it up in here. We're working together, obviously.

The thing is, this was brought up in connection with TIB-0009, I think, five years ago. We made that original comment
about TIB-0009. I believe I was involved in that.

So we were simply making a little nudge that you're never going to just -- never going to resolve, and it keeps coming up in every -- in many Site Profiles such as this one, so it could remain -- how long can it remain in abeyance?

CHAIRMAN ZIEMER: It won't remain in abeyance here. We would -- it's not a TBD-6000 issue. It's moved out of our jurisdiction.

DR. NETON: At one point -- at one point, it was closed. It was closed at one point, and then SC&A --

DR. MAURO: Well, I've got to --

DR. NETON: -- reneged on that, and it came back.

DR. MAURO: You sold me. You sold me on the 100 MAC, and I came up with 20. I said, "I'm all right," but then I said, "But, wait a minute. It's very rarely" --
DR. NETON: But then we got it down to this what are you really ingesting, the percentage of material, and I agree it's --

CHAIRMAN ZIEMER: Yes, but the point is, though, that technically if it's a TBD -- a TIB-0009 issue, we can't really close it, anyway.

DR. NETON: I agree. SC&A came in with their little 10 microgram vial. But I suggested that that half microgram was distributed in 100 milligrams.

DR. MAURO: And that's -- and we were okay with that.

CHAIRMAN ZIEMER: Mark?

MEMBER GRIFFON: Just one more thing. I think this is relevant to the 6000 discussion. How much -- you said this would only be used if you didn't have data. How many of these facilities are covered in TIB-6000? Do you have any sense of how often those models -- is it 50 percent of the time? Is it --
MR. ALLEN: I want to say quite a bit for the 6000.

MEMBER GRIFFON: Yes. So you're saying it's only going to be used for --

(Simultaneous speaking.)

MEMBER GRIFFON: That means all the ones in TIB-6000, doesn't it, or almost all of them?

DR. NETON: If we had data, it wouldn't be there.

MEMBER GRIFFON: Okay. Okay. I just wanted to clarify that.

(Simultaneous speaking.)

MEMBER GRIFFON: You don't have this data. The data is not there. That's why you have 6000. Okay.

CHAIRMAN ZIEMER: Any other comments on this? That would complete our items on TBD-6000 until we talk about it after the break in terms of Mark's concern on issue 1. Maybe this would be a good time to go ahead and take a break. It's 10:00. Let's
take a 15-minute break. Then we'll resume.

MR. KATZ: Okay. I'm just putting the phone on mute for 15 minutes for the break.

(Whereupon, the above-entitled matter went off the record at 10:00 a.m. and resumed at 10:17 a.m.)

MR. KATZ: Okay, this is the TBD-6000 Work Group. We are just reconvening after a short break, and let me check. Henry, do we still have you with us? How about the petitioners, Dan and --

CHAIRMAN ZIEMER: John is the site expert.

DR. MCKEEL: This is Dan McKeel.

MR. RAMSPOTT: This is John Ramspott. I'm here.

MR. KATZ: Okay. Thank you.

CHAIRMAN ZIEMER: Thank you. Okay. We'll proceed. During the break, Mark Griffon had a chance to review some of the numbers that he was concerned about which
dealt with the extremity exposures from the Putzier effect, and, Mark, do you want to sort of summarize your observations and conclusions on that after having considered the numbers and discussed this some with Dave Allen, as well?

MEMBER GRIFFON: Yes. I guess the main thing I was looking at, just to refresh everybody, is the situation of the extremity, the hand or forearm. There's -- and the model as it is currently laid out, I believe, assumes -- well, I don't know if it's the distribution, but -- oh, it is the distribution. Okay.

I was going to say the contact they're talking about from uranium metal is like 230 mR per hour, so we were just looking at some back-of-the-envelope sort of calculations, 230 mR per hour. It assumes you're there for four hours, and I was saying with the Putzier effect you've got doses up to 2 to 3 R per hour.
So if you back-calculate how long would you have to be there, assuming the "real" numbers, it would be less than a half-hour, maybe, in contact or 20 minutes, 15 minutes, depending on the -- I think there's a range of numbers that Putzier provided, but the high numbers were 2 to 3,000 mR per hour.

So, you know, and Dave and I had a little discussion on that. I mean, the only place this really comes into play -- because I think the other models are reasonable. The assumptions, the conservatism built into them are reasonable.

All I would say is would it be possible to put some sort of caveat in the TBD-6000 saying for the dose reconstructor to, you know, if the assessment of a skin cancer on the hands or forearms comes up and is not compensable --

You know, like you said, these doses are already pretty high. They may be compensable cases with the existing model.
Then, you know, a footnote, the dose reconstructor may consider using this, you know, data from the Putzier or adjusting the model by a factor of X, and maybe you can --

You know, it's just a thought that maybe the current approach could be modified. It would be for a very small slice of cases that you'd be dealing with, but it would address my, you know, little technical concern here.

MR. ALLEN: Actually, for TBD-6000 altogether, it essentially, like we've said all along, you know, it's defaults, and there is some language in the early part of that document that says, you know, specific information can be used to adjust a claim, essentially, or a site.

I know we have done that when we had, you know, some specific information on a particular claimant. I've got to add language on the Putzier effect, and I could reiterate something like that if we have some specific
MEMBER GRIFFON: Yes, I think that would address my concerns.

MR. ALLEN: Just a caution, you know, like I was saying.

MEMBER GRIFFON: Right.

MR. ALLEN: Often, we don't have specific information. I mean, that's kind of what TBD-6000 is about, so it's -- I'm not sure when that would apply, but, you know, I can leave the door open.

MEMBER GRIFFON: At least leave it -- yes, I think that would address my concerns, and even if you specify for, you know, for --

CHAIRMAN ZIEMER: I think it's only an issue, I believe, for the extremity situation where you're postulating the hands and maybe forearms are in close contact for some extended period, which is relatively short compared to the original model's assumptions. Maybe it's as short as a half an
hour or something.

This is somewhat analogous to having the two models that we have in the situation where you look at them both and take the one that gives the higher dose or the higher Probability of Causation.

I suppose it's analogous to that, but it sounds to me like this is a little less -- has a little less specificity in terms of it doesn't direct the dose reconstructor to specifically use an alternate model so much as to say that you might consider whether or not the Putzier effect would change things, and he would have to have enough information to make some different assumptions and adjust his calculation accordingly.

MR. ALLEN: In all honesty, Mark, I'm not sure exactly how I would word that or whatever.

MEMBER GRIFFON: Right. I'm thinking about this --

MR. ALLEN: I can leave the door
MEMBER GRIFFON: -- is going to say, "Well, what factors should I adjust it by?"

CHAIRMAN ZIEMER: Yes, that's what your understanding of --

MEMBER GRIFFON: -- accounted for this.

CHAIRMAN ZIEMER: Yes. If it's too vague, it recognizes that possibility without giving the dose reconstructor --

MEMBER GRIFFON: Any recourse.

CHAIRMAN ZIEMER: -- any guidance as to exactly what is supposed to be done. That would be concern I would have, so what I'm wondering is if -- and I don't want to delay the revision if possible, but maybe I could ask both of you to think about what the wording might be that would be helpful to a dose reconstructor.

For example, if we had a -- if we had a situation based on what we know about --
and we're talking here generically, not about, for example, General Steel particularly, but in general what do we need to know?

We need to know something about handling in the particular case in question, right, handling time? So you need some evidence that things were handled.

MEMBER GRIFFON: I guess I would argue that you just need to know the type of - - you know, if it's a skin cancer on the hands or forearm.

DR. NETON: That would be sort of a default, then.

MEMBER GRIFFON: Yes.

DR. MAURO: Yes, but it's for Putzier now.

DR. NETON: That's what I just said.

DR. MAURO: That's a very specific set of circumstances has to occur for you to have a Putzier.

DR. NETON: You have to identify
that a uranium metal could have been there.

DR. MAURO: Yes, specially cast.

CHAIRMAN ZIEMER: Right, but what is done in that case? That's what I'm saying. What do we tell the dose reconstructor to do, because the calculation presumably has been made based on the model?

He's found it's not compensable, and now it says in that case, forearm cancer, and you know that Putzier effect is in play. What do we do?

DR. NETON: I'm trying to think of the different scenarios that occur in the AWEs. It would have to be recast metal.

MEMBER GRIFFON: You'd have to identify certain sites where it could have been a factor.

DR. MAURO: Putzier is such an unusual --

CHAIRMAN ZIEMER: One at a time.

DR. MAURO: Okay, if you go through your -- make your bomb. You do your
reduction. You generate uranium. Now it's -- there is -- you have -- that's clean now. You don't have any thorium-234.

Okay, now, okay, it sits for three or four months, okay. The thorium-234 grows back in again. Then you recast it, because you want to get it into another form, another mold. Now, the thorium-234 is there.

Now, under those circumstances, when you recast it, then you get a very real possibility of the thorium-234 that had grown in over that time period finding its way to the outside, and then it's out there, enriched, if that's the right word.

For a period of time, though, that's limited by its, what, 28-day half-life.

DR. ANIGSTEIN: Twenty-four.

DR. MAURO: Twenty-four day half-life, so there is this window. That's the set of circumstances that has to occur, and, you know --

DR. ANIGSTEIN: But it's not -- it
doesn't have to be that extreme. That's for the extreme. Any time that you have casting of uranium, unless it was refined the day before, but, I mean, with a 24-day half-life, even if it's 24 days, you're going to hit 50 percent in growth.

So, as long as there is a delay prior to the casting comparable to the half-life, and as long as there is not a great delay after the casting, because, by the same token, if it's cast and it sits in a warehouse for three months, all the external thorium will have decayed. The normal thorium would have grown in, and now you will have a uniform, the usual uniform concentration.

So the point which I am --

CHAIRMAN ZIEMER: Well, we all understand that. The issue is what are we telling the dose reconstructor to do in the absence of very clear information? Presumably, we don't have the actual -- you know, this would be a case where they didn't
have extremity dosimeters, for example.

DR. NETON: Well, this would only be the case with these freshly made derbies or ingots, right? I mean, once you start extruding them into rods or bars or whatever, that stuff goes away, and isn't that the majority of the AWEs where they did like bending, grinding, machining operations on finished product, not the original cast ingots?

MEMBER GRIFFON: Some of those maybe only apply to few sites.

DR. ANIGSTEIN: Even in the -- Bill, are you on the line, Bill Thurber? I guess not. I don't know whether, when you have the -- you have your ingot with the thorium on the surface. Now, if you start rolling it, I would imagine some of the thorium will still stay on the surface.

So just because you change the shape doesn't mean that it's gone away. I don't know. That's why I was -- our
metallurgist is no longer with us at the moment.

MR. THURBER: Well, some of it --

DR. ANIGSTEIN: Oh, there he is.

MR. THURBER: Some of it probably scales off, too. It depends, you know, obviously, on how effective your salt bath is or whatever to maintain the oxide that forms on the surface, but some of it's probably going to come off.

DR. MAURO: It was my understanding that you don't want this stuff.

MR. THURBER: No. Well, one --

DR. ANIGSTEIN: Not necessarily all of it.

MR. THURBER: A point I don't quite understand is this. The dose reconstructor is going to use the full distribution, which includes this large geometric standard deviation of five, and so I don't quite understand why when he's doing that he's not accounting for the fact that the surface
concentration may be higher than the median.

CHAIRMAN ZIEMER: I think Mark's --

MEMBER GRIFFON: I don't have the
distribution in front of me, but I don't know
what the median is, even.

MR. THURBER: Well, in our -- in
our White Paper, we showed that the 95th
percentile value from TBD-6000 dose to the
hands and arms was 3,250 rem, and we did --

In this same comparison table we
did a simple-minded calculation, basically,
where we took the 230 millirem per hour
number, multiplied it by a factor of 15 to
compensate for the thorium 234 concentration
on the surface, and assumed an exposure of
1,000 hours per year, and that comes out to be
essentially the same number.

So, when you -- and we said that's
kind of a theoretical maximum, if you will, so
the theoretical maximum by this back-of-the-
envelope calculation, if you will, in the 95th
percentile from the TBD-6000 distribution were
basically the same. So, as I say, I'm not clear why, given those kind of numbers, that this problem is not embraced within what the dose reconstructor would normally do.

MEMBER GRIFFON: That might -- you might have just answered my question. I didn't know -- I didn't have the distribution in front of me. I mean, the only -- then, the only caveat I'd ask NIOSH to consider is maybe it makes sense to use the 95th for hand and forearm dose instead of --

But it sounds like even the full distribution, he's saying, comparing it to the same kind of back-of-the-envelope calculations we did is bounding, so if that's the case, that would answer my concerns.

I guess that's the only thing I would leave open is maybe that's the -- I'm trying to pull this up while we're talking, but maybe that's the caveat is that instead of using the full distribution for hand and forearm cases, they could consider the 95th,
you know, the maximum instead of applying the full distribution.

CHAIRMAN ZIEMER: Mark, you --

MEMBER GRIFFON: It would only be for these specified sites, too. You don't have to -- it wouldn't be all sites, maybe, because even if you're at a rolling -- even if what you said, Bob, is true, that it doesn't change, the characteristic, it's still there, but you're not going to be in direct contact as much in a rolling operation, I would assume.

DR. NETON: I would hope not.

MEMBER GRIFFON: Yes, I would hope not.

CHAIRMAN ZIEMER: Well, you're talking about using the specific 95th percentile value, rather than a distribution?

MEMBER GRIFFON: I'm just asking if they can examine that possibility for this hand and forearm --

CHAIRMAN ZIEMER: Does that --
MEMBER MUNN: Oh, we didn't cover that?

CHAIRMAN ZIEMER: That doesn't --

MR. ALLEN: Well, it's kind of the discussion we had the last Work Group meeting.

CHAIRMAN ZIEMER: Yes.

DR. MCKEEL: Dr. Ziemer, this is Dan McKeel.

CHAIRMAN ZIEMER: Yes?

DR. MCKEEL: May I make a quick comment, please?

CHAIRMAN ZIEMER: Yes.

DR. MCKEEL: I want to make a comment about not being exposed during a rolling mill operation. The men at Dow who rolled a lot of thorium containing alloy plates mentioned that as part of that process often there would be little buckles and rough places in the roll sheets and plates, and they would have to go with a piece of, basically, sand paper, which they held in their hands right against the rolled sheets and sand it
CHAIRMAN ZIEMER: Probably sanding

--

DR. MCKEEL: So they say that there was intimate exposure during the rolling operation, so I just needed to mention that, and I also need to mention you all are continually talking about Putzier effect, derbies, and ingots, and I just need to enter into it again that that was one type of uranium metal. The other type was the one-step.

That was a two-step process, and then the second process patented at Mallinckrodt, used at Mallinckrodt downtown, used at Weldon Spring was the one-step dingot process, and what that resulted is a different, thicker outer crust, but in both cases, for the ingot and the dingot, it didn't just flake off.

It had to be -- and we have provided photographs of this and descriptions
of this process. The crust had to be machined off with vertical lathes, and we've shown pictures of that being done, and at that point, if you know where to machine that off, what resulted was a bright, shiny inner uranium core that then developed an oxide and all that.

So, we believe that there probably was a difference in a one-step dingot and a two-step ingot in the amount of thorium-234 that built up in that crust, and to ignore dingots altogether is just not representative of what was going on.

And you might say, "Well, how many places use dingots?" Well, we know at least from technical documents at Mallinckrodt that Mallinckrodt dingots now, not ingots, which were also used, but they were sent as fuel rods to the Hanford Production Reactors.

In fact, the dingots were used there for quite a while, and then the dingots were finally scrapped, because they were not
dimensionally stable in the reactor.

They swelled, and despite adding trace metals and other alloys, they couldn't correct that problem over what they got with ingots. But, in the meantime, the dingots went to at least, you know, Weldon Spring and Hanford and probably other sites around the complex.

So I just -- I just think it's really short-changing the real world to not consider the differences between the outer crust of an ingot and a dingot with respect to the Putzier effect. I'll just let it rest at that.

MR. THURBER: This is Bill Thurber. Bob Anigstein, didn't -- did you make a calculation that showed what the atom surface density might be for thorium-234?

DR. ANIGSTEIN: In terms of the physical surface density?

MR. THURBER: Yes, in terms of how thin a layer would actually produce this
effect.

DR. ANIGSTEIN: Oh, microscopic.

MR. THURBER: Microscopic. See, I think one of the confusions here is this, that the crust that Dr. McKeel talks about is probably uranium oxide. The surface -- the extraordinary surface concentration associated with the thorium-234 is microscopic. You can't see it, so we're talking about two totally different things here.

DR. MCKEEL: Well, the crust that I'm talking about, Dr. Thurber, is not uranium oxide. I'm talking about the crust that has to be cropped off that results after the bomb, and that's magnesium fluoride.

MR. THURBER: Yes, I understand that.

DR. MCKEEL: Okay.

MR. THURBER: Yes.

DR. MCKEEL: All right. Okay.

MR. THURBER: But that has nothing to do with the Putzier effect, per se. That
involves microscopic thickness of thorium atoms on the surface of the uranium shape.

DR. MCKEEL: The uranium core?

MR. THURBER: The uranium shape, whatever it is, dingot, ingot.

DR. MCKEEL: Well, that's what I'm trying to tell you. What was sent over to General Steel, for instance, is a uranium dingot with the crust intact, still on the inner core, and that's why radiography was done to define how thick the crust was and then to allow machining with a vertical lathe to remove it so that very little, if any, of the uranium core was involved.

So I think the, you know, the surface dose that somebody put their hand on, unless they were working with a freshly scalped uranium inner core, was putting their hand on top of the magnesium fluoride shaggy crust that was on the outside of those dingots, and there was also a shaggy coat on the outside of the ingots before they were
cleaned up, as they came out of the bomb, and there are numerous pictures showing that.

MR. THURBER: Yes, but there is --

DR. MCKEEL: Okay.

MR. THURBER: It's my understanding, and I could be wrong. It's my understanding that the Putzier effect was not observed on the product of the bomb reduction.

DR. MCKEEL: Well, then that needs to be -- well, what -- then it was observed on a freshly scalped ingot?

MR. THURBER: No, it was a freshly cast ingot.

DR. MCKEEL: You don't understand. There isn't any way to cast an ingot without having -- it's all done in the bombs, which have that coating of magnesium fluoride, whether it's an ingot or a dingot.

MR. THURBER: In the two-step process, if you take the product of the bomb reduction --

DR. MCKEEL: Yes.
MR. THURBER: -- and you recast it in a vacuum induction furnace, and it is in the vacuum induction furnace in particular where the Putzier effect is observed, and there are -- there is patent out there which says that you don't get the Putzier effect in the bomb-reduced product, per se, before it is recast.

DR. MCKEEL: Okay. Well, if all that's true, is that going to be in TBD-6000? I think that ought to be clearly explained, then.

CHAIRMAN ZIEMER: That could certainly be included in the explanation. The crust that you're talking about, can somebody enlighten me as to -- that's not a crust that increases the surface dose, is it? It's not -- it's not an active product. If anything, it would decrease the surface dose, I would think.

DR. MCKEEL: That's right, unless the thorium-234 accumulates on the surface of...
the crust.

MR. ALLEN: In the thermite process -- the reduction bomb process, usually, magnesium metal mixed with uranium tetraflouride reaction causes the fluorine to go with the magnesium and create magnesium fluoride. The leftover uranium is simply uranium metal in a molten form that drains to the bottom of this pot.

DR. MCKEEL: There you go. That's exactly what I was saying. So the thorium does go with the magnesium fluoride. That's their entire point.

DR. ANIGSTEIN: He's right.

DR. MCKEEL: And it's been overlooked. Anyway, I can't make that point any stronger.

CHAIRMAN ZIEMER: I want to get some clarity on this. Are we saying that the crust itself is higher in thorium content than is accounted for? Is it like the Putzier effect? Otherwise, we thought we had
enveloped this whole thing with the Putzier effect. Bob?

DR. ANIGSTEIN: The Mallinckrodt TBD states that the surface dose or the activity, exposure rate at the surface of freshly -- of the freshly created magnesium shapes in the bomb process is actually lower than from aged uranium in equilibrium with its progeny.

You have actually -- at first, I was puzzled by that, because I thought here the Putzier said it's higher. They say it's lower, and the two are not inconsistent or two different processes.

And Bill Thurber and I -- Bill, correct me on this if I'm not quoting right -- had discussed the possibility of this scalping, and from a metal production standpoint it really doesn't make much sense, because when you want to remove the scalping, and you know, certainly the vertical lathe is not only -- I don't have a picture of it, but
it's perfectly reasonable they would do that.

The coating is not uniform, so one radiograph or a couple of radiographs, like I said, four-shot, four-corner shot, would not tell you how much to remove. The machinist knows how much to remove. There is a very visible difference between the scale and the metal, and they would just go --

CHAIRMAN ZIEMER: Until they got what they wanted.

DR. ANIGSTEIN: They would just go gradually, a thousandth of an inch at a time if necessary, until they see, "Okay, we got rid of scale. Now we're down to the uranium."

DR. MCKEEL: Dr. Anigstein, I just read you all from Weldon Spring. I think it's TBD-28. It says, "The amount of metal to be removed by cropping in order to produce sound material for rolling is determined by the use of high energy X-rays."

Now, I don't know how much clearer that could be, so the idea that you don't need
radiographic delineation of the interface between the inner uranium core and the outer crust is just contradicted by a large volume of literature that's been provided.

So I can -- I personally cannot prolong this argument any longer. I think -- I think that's just the way it is, and it's been very well documented, so I think I'm just going to have to let it go at that.

CHAIRMAN ZIEMER: Well, in any event, my question remains. What is the characteristic of the crust that would require us to deal with it separately as far as exposures to the worker are concerned?

DR. MCKEEL: Well, Paul, I would say the reason why is because, as was just stated, the thorium goes -- binds to the magnesium components of the magnesium fluoride crust and that that's where the action is. That's where the -- I mean, that's where it's located. That's where the thorium is located that we're talking about.
CHAIRMAN ZIEMER: Okay. Thanks.

Let me --

DR. MCKEEL: All right.

CHAIRMAN ZIEMER: Dave?

MR. ALLEN: Dr. McKeel interrupted me when I started that process, but I definitely didn't say that thorium goes with magnesium. I simply don't know if it stays with the uranium or goes with the magnesium.

You will have left at the end of this process a derby, or if you're doing a direct ingot you'd have an ingot. It will have a magnesium fluoride type of crust on it.

I know at Fernald it was you produced derbies first and then re-melted those in the -- recast them, and the derbies you had to break out of this hard, crusty magnesium fluoride left over from the operation, and they even needed pneumatic hammers type of thing to get some of this off.

CHAIRMAN ZIEMER: Dr. McKeel, were you aware of any references that indicate the
thorium is with the crust? That's what I'm trying to --

DR. MCKEEL: There is a table that I provided in one of the Weldon Spring brochures. I can't -- the atomic fuels or fuel for the atomic -- I can't remember. Maybe Mr. Ramspott can remember which one, but in one of those tables it mentions as a component of the Weldon Spring uranium, some thorium, and it's at a very low level, and I'm not even sure.

I don't think that table mentions thorium-234. I think it mentions thorium-232, so that's the only information that I know about that, and, you know, that's obviously a crucial point.

CHAIRMAN ZIEMER: Okay.

DR. MCKEEL: But what Dave Allen just said I appreciate that needs to be also understood that the derbies did not come out as clean, shining, smooth uranium. They also had that magnesium fluoride crust, and Dr.
Anigstein is exactly right that it was of highly variable thickness, and it was a rough coat on there, and it had, as David said, it had to be chipped out with pneumatic hammers, and you can imagine how precise that operation is. So, anyway --

CHAIRMAN ZIEMER: Okay.

DR. MCKEEL: Okay.

CHAIRMAN ZIEMER: Well, I think some good points there, and probably, Bob, you're probably right when even with an X-ray picture, which would show the unevenness, the machinist probably had to continue to get that down to the shiny surface with the machining operation.

But I guess now I'm concerned that have we characterized the surface dose rates of the dingots? Do we know the thorium content? It sounds like something sort of analogous to the Putzier effect in that you have -- maybe have thorium there or not. Do we know that?
MR. ALLEN: Well, we weren't looking at that as part of this. We haven't seen anything that says that, at least, no significant type of effect like that with the thermite reduction process.

CHAIRMAN ZIEMER: Okay. Can we agree that as part of the revision that you develop in discussing the Putzier effect that you will also discuss the crusts relating to the dingots and whether or not there are elevated exposure rates from those things that would need to be taken into consideration?

DR. MAURO: I'd like to add there's one more step in the process there, I think, when you tell the story. You still have the uranium hexafluoride, which is the material you put in the bomb.

If that's freshly produced uranium hexafluoride, there is no thorium, okay. So, therefore, if it's old, there will be thorium. So, unfortunately, it's all the timing, so if you go in, and you go through the reduction
process with fresh uranium hexafluoride, you're not going to get the thorium.

If it's aged, you can get the thorium, and whether or not it shows up in the crust is another matter, so if you just --

CHAIRMAN ZIEMER: It's got to be discussed in that framework.

DR. MAURO: Part of your story.

CHAIRMAN ZIEMER: Right.

MEMBER GRIFFON: But I think those are things you can't know.

DR. MAURO: That's right.

CHAIRMAN ZIEMER: Right, and if you don't know, you'll have to make some assumptions, so --

MR. ALLEN: Just from my past experience, I remember getting uranium tetrafluoride in from the gas diffusion plants that had been there for several years.

DR. MAURO: See, there you go. And that's going to have thorium.

MR. ALLEN: When we did the
reduction, we didn't see the highest data dose in the reduction area that we did see in the recalculated --

DR. MAURO: Is that right?

MR. ALLEN: That's an experience.

MR. RAMSPOTT: Dr. Ziemer?

CHAIRMAN ZIEMER: Yes?

MR. RAMSPOTT: This is John Ramspott.

CHAIRMAN ZIEMER: Yes, John?

MR. RAMSPOTT: I'm going to email you the booklet that definitely mentions thorium. It's published by Mallinckrodt. It was done by Harold Thayer, the President of Mallinckrodt. It was in my original workbook that I gave you guys four years ago, and I'm going to resend that to you in about two minutes.

CHAIRMAN ZIEMER: Okay.

MR. RAMSPOTT: And it definitely says it, but I have another -- I'm really confused. In looking at page nine of TBD-
6000, it says all radiation must be included in dose reconstruction on page nine, very clearly, and let some dose reconstructor --

I've heard the words "maybe," "possibly," "if it makes a difference," "if it's marginal." I don't see that anywhere in the law. I think it says "must."

I would think this has to be considered in any revision to TBD-6000, unless I'm reading this incorrectly, but that's what the document says in front of us, and it said it in about three other documents we have.

Everybody -- matter of fact, Dr. Neton just referred to "all" and "must" earlier in this meeting. I would think the Putzier effect would go under that "all" and "must," unless I'm missing something, and if somebody could explain that to me, I'd sure appreciate it.

CHAIRMAN ZIEMER: And, in fact, it's the intent that these do be included. That's why we're having this discussion.
MR. RAMSPOTT: That's what I thought, but I heard some dose reconstructor would have the option of maybe using it.

MEMBER GRIFFON: John, that was my -- I think that was my comment, and I was saying that if -- you know, it's NIOSH's efficiency process, kind of. If it was a compensable claim, then they wouldn't even -- you know, it wouldn't have to be any further consider -- it was just an efficiency process, but in general you're right. All doses have to be considered.

MR. RAMSPOTT: I guess I was misunderstanding that, then, because I heard -- I mean, I wrote it down. It was about ten references to maybe, possibly, could be. I don't think that's the intent of the law. I don't think some dose reconstructor should have that option.

CHAIRMAN ZIEMER: Well, no. You've got to understand that the Putzier effect is not always there for every condition, so they...
-- that's the issue. If it appears that it has to be taken into consideration, then that's what the dose reconstructor has to do.

MR. RAMSPOTT: Isn't that kind of a maybe? How does he know what sites? As John Mauro was saying, how do you know? Does it grow back in?

CHAIRMAN ZIEMER: Yes.

MR. RAMSPOTT: I mean, it could be there. How does this dose reconstructor, how is he the all-knowing whether it's there or not?

CHAIRMAN ZIEMER: Well, that's why I asked to look at the specific case, if it's, you know, whether it's -- and if he can't determine that, then he has to assume that it's there, so then that's how it's taken into consideration.

In any event, let's ask that NIOSH include this discussion as they do the revision, and I think the net result will be this will end up in abeyance until we see. I'm
wondering if you can, Dave, perhaps for the 
next time develop for us what the wording 
might look like in terms of the revision. 
Would that be feasible? I know that --

MR. ALLEN: I think so, yes. 
There's been enough discussion. I think it's 
probably worth drafting it and sending it 
around to the Work Group, at least.

CHAIRMAN ZIEMER: Yes, so that we 
have a -- what will the revision contain in 
terms of dealing with the Putzier effect, in 
terms of dealing with the crusts on the 
dingots, and the related matters in terms of 
how dose is reconstructed for these cases 
where there are extremity cancers. Bob, any 
additional comments?

DR. ANIGSTEIN: Yes. About this 
business of the cropping of the ingots -- Bill 
Thurber?

MR. THURBER: I'm here.

DR. ANIGSTEIN: Is it your -- would 
you agree with my impression that the cropping
is not turning it on a lathe but cutting off the ends?

I know that in the vacuum induction process that I was familiar with at the Manufacturing Sciences Corporation -- that was a facility at -- not part of but inside Rocky Flats where once they cast the ingot, on top you would get a porous area, region, which was not good metal and also would contain a lot of thorium.

And you referred to it as the hot top, and it would be cut off with a bandsaw, and then, of course, the bad part would simply be thrown right back into the recycling process and, you know, and then run back in.

And that would be very -- that would be very consistent with what we heard from one of the workers where they didn't radiograph all the edges. They just radiographed the corner. They took a two-corner shot.

Then they flipped the ingot over
and took the other two corner shots, so it seemed to me like they were looking for the ends, not for the entire periphery, and there you would need guidance, because the machinist would not know where to place the saw in terms of getting all of this defective metal at the end, not necessarily contaminated metal, just porous and not nice, uniform shape for rolling. Does that make sense, Bill?

MR. THURBER: That's correct, Bob. Common -- common terminology in the industry for cropping is exactly what you say. It's cutting the end off, and it may be the bottom for other reasons but particularly the top because of porosity if you're dealing with an alloy, segregation of metal to the top and so forth, but that's the proper -- that's the commonly accepted industry terminology for cropping is cut the ends off.

DR. ANIGSTEIN: Good. Thank you.

DR. MCKEEL: Well, the other term that's used -- this is Dan McKeel again -- is
scalping, so if you read that literature, cropping is one term that's used, and, actually, John has some information -- I think, again, that we've sent to the Work Group -- that indicates that cropping could be as much as the top third of an ingot, so it wasn't just some little crust, and it varied from ingot to ingot.

So, you know, and I am absolutely 100 percent positive from the literature that we've read that ingots were covered. As they came out of the bomb, they were covered, sides, top, and bottom, with this magnesium fluoride residual crust from the bomb, and the two words I've seen described of that are, at least, cropping and scalping.

MR. THURBER: Again, we're talking about two separate things here, and we're confusing the terminology and the operations that were done. In the case of a cast ingot, which is what you're going to use as the starting point for your rolling or for your
extrusion or whatever, that is the ingot that
Bob was talking about that is cropped, and it
may be a third. If it's a bad casting, you
could throw the whole thing away.

Now, the bomb product is something
else and was treated differently. Indeed, it
had scale on it that, as David Allen or
someone -- I'm not sure who -- suggested is
chipped off with a pneumatic hammer.

That was a different animal,
treated in a different way, and I haven't seen
the evidence, and there was someone in the
background there talking that I think said
there was no evidence of high beta exposures
when handling the product of the bomb
reduction.

So we're talking about two
different things, and we have to be very
careful about the kinds of operations we're
attributing to each physical entity in the --
in the process.

DR. MCKEEL: Well, I can tell you
that -- this is Dan McKeel again -- that with respect to General Steel and Dow -- which at Dow, of course, they did experimental extrusion of uranium from Weldon Spring, and they did rod straightening for the fuel rods -- the material that they sent over from Weldon Spring from Weldon Spring literature was derived from dingots, so that's just the way it was.

So I think that we, at this end, understand the operations. I think that the exact operations involved and the distinctions you're making need to be gotten straight with NIOSH, and that needs to be much clearer than it is now in TBD-6000, and I think that's what we're talking about.

CHAIRMAN ZIEMER: Yes, and we have a commitment for NIOSH to discuss this in the revision, and Dave is going to prepare a -- I guess I'd call it a preliminary draft for the Work Group to look at. Of course, we will make it available to the rest of the folks,
too.

I presume that if we're able to -- it's a working document of an agency, so I don't know how to commit on this, but we're going to have a look at what that will be, so this particular item I think automatically will go into abeyance then until we see that product, and then we can perhaps close it at that time.

Thank you for input on that. I want to move us onto Appendix BB specifically now, which is, of course, the General Steel Industries Matrix, and we have some open items there that we want to discuss as we move forward here. Under agenda, it's item 4.

Issue 1 was NIOSH evaluation of new documents relating to source term and also status of the film badge records, and let me -- let me start us with the second of these, because I think this is going to be maybe a brief report.

You may recall that NIOSH has
issued a contract, I believe, to Landauer for the purpose of having Landauer go through all the Picker records that they had on hand to try to identify any that were related to General Steel Industries, and actually, I think the contract goes beyond that to cover other facilities for which Landauer might have Picker records that apply to other facilities in the program.

Dave, can you report to us on the status of that, the Landauer film badge information?

MR. ALLEN: Well, what we have been told by Landauer is that Picker dosimetry data would have been incorporated into their microfiche library, essentially. That is not set up, apparently, in a way that is easily retrievable. It's all account numbers, et cetera. We gave them a contract to, not just with GSI, to basically catalogue all the --

CHAIRMAN ZIEMER: All the records.

MR. ALLEN: All the customers that
they had, the time frames they had records for. They got about -- we got a partial list from them, and it ran out of money. We're trying to get some more money for that to get the rest of it. It's apparently a fairly large job for them to do this, and the partial list we got was nothing --

CHAIRMAN ZIEMER: Nothing so far related to General Steel Industries? This is only a -- is it a partial list of records or just the names of facilities where they have records?

MR. ALLEN: It's a partial index, essentially, is what it amounts to. It's the list of companies that they have film badge records for and the time frame that they have it, and it's not necessarily -- you know, you won't necessarily have GSI 1964 to 1972.

We might have GSI 1964 to '66 and then a separate set of records that goes beyond that. It's a bit of a hodgepodge there, but we're getting a catalogue where we
can search it and they can search it, and we can ask for a specific set of records is the goal here.

CHAIRMAN ZIEMER: So that's ongoing.

MR. ALLEN: Still ongoing.

CHAIRMAN ZIEMER: And --

MR. ALLEN: It's apparently a very big job.

CHAIRMAN ZIEMER: My understanding from them it's kind of an overload thing there --

MR. ALLEN: Yes.

CHAIRMAN ZIEMER: It's not their highest priority in terms of what they're able to do in terms of taking care of their own customers, I suppose. Is that correct?

MR. ALLEN: Yes, that's the way I understand it. It's a very big job that is done as they can type of thing. The contract with us is not big enough for them to ignore their customers or anything, so they catch
time when they can.

CHAIRMAN ZIEMER: Well, it may or may not provide additional input for us, and I guess at this point we can't count on that as being available in the near future, and I think, certainly, on General Steel we have to proceed with what we have in hand, and, you know, we're not going to sit around for years and wait for something to be found there.

Bob, did you have additional comment?

DR. ANIGSTEIN: Yes, I'd like to comment on that since it was SC&A that came up with the idea, I believe, that the Picker -- you know, one of our -- one of our associates found out that they did, in fact, have the, you know, records from Picker, and one of the workers, former workers, had suggested that because they bought their regular X-ray film from Picker, perhaps Picker was the supplier.

However, having looked at the information from NRC, formerly AEC, of all of
the license records, the document related to licensing, it appears that Picker was not the purveyor.

It was a company called Nuclear Consultant Corporation, which my impression was it was like a one-man firm with his family members or whatever helping, and that they supplied both. They did the radiation safety surveys, and they supplied the film badge, film badges, and that company has -- actually, Dr. McKeel pointed out and I confirmed -- was purchased by Mallinckrodt sometime in the '60s.

But since, to my knowledge, and I hesitate to -- I'm not pretending to be an expert on old film badge companies. Mallinckrodt was not in the film badge business, so it would seem unlikely that those records would have been preserved.

CHAIRMAN ZIEMER: Well, in any event, the probability of this particular pursuit bearing fruit for this facility seems
more remote than it did originally, but NIOSH is still pursuing it because it may provide some information for other facilities, which will make it worthwhile.

But we now have the other documents that you referred to, and I agree there is no hint in those other documents that Picker X-ray was involved in the film badge dosimetry at all for this facility.

Now we do have, relating to issue 1 on the matrix, which is dealing with source term information and that sort of thing, we have -- well, you've gotten two things since our last meeting.

One is Dr. McKeel made available to the Work Group Members the NRC website on which all of these documents are available, and we've been able to -- Work Group Members, if you wish to, could look at those individual documents, the licenses, various correspondence, inspection reports, and so on, so a lot of material there, some clarity on
source terms, which had been somewhat lacking before but some confirmations in some cases of those source terms and so on.

From that, NIOSH has presented a new analysis for us, and this was distributed, I believe, to -- well, I know to the Work Group Members, as well as to the petitioner, and this is called -- hopefully, we'll get the right paper here -- "Portable Radiography Sources at GSI," prepared by Dave Allen, DCAS, May 2010.

Dave, I think probably it would be worthwhile for you to give us a quick overview of this and indicate what has changed since your original sort of approaches to dose reconstruction at GSI based on this information.

MR. ALLEN: Okay. Let me pull that up here. This was intended to be -- it says "Portable Sources," because I, you know, kind of took this one bite at a time. I wasn't dealing with the betatron or anything like
that.

CHAIRMAN ZIEMER: Right. This is separate from the betatron.

MR. ALLEN: We had gained --

CHAIRMAN ZIEMER: Betatrons.

MR. ALLEN: We had gained the information from the NRC documents, and it also incorporates information we've been told in the various Work Group meetings or worker outreach meetings.

We've got the time frames when two smaller, approximately quarter curie, cobalt-60 sources were purchased by GSI. It was in essentially the middle of 1962. We have -- the exact assay of them was .26 and .28 curies.

We have information from those records that they gave to AEC that prior to that they were using two 500-milligram radium-226 sources, so that gives us an assay value, and they don't decay very quickly, so we can pretty much know what assay value they were
We have from, I believe, the last Work Group, possibly the one before, information that they would rope off an area, delineate an area somehow that was one and one-half times what was the required boundary.

The required boundary by AEC at the time was two millirem per hour, and we also had information that the radiographers would leave that area, go run film or whatever, and sometimes workers would walk through those delineated areas, didn't necessarily comply with those boundaries.

Taking all that into account, we tried to see what we could do, what we would do with that. From the assay values, the two cobalt sources and the radium sources we've been using the gamma ray constants of these well known types of sources, we could come up with dose rates at a foot, and using the -- I can't think of the rule now.

Using well known physics, we can
determine the dose rate from various
distances, and we come up with a preliminary
assessment in here that basically said, "If
the radiographer was standing at the boundary
the entire time that they were X-raying, what
would the dose be for the year?"

We then went into a dose estimate
essentially for folks walking through that
area, and that was the more complicated part,
of course, and for that we essentially said --
we essentially are assuming they are standing
at the edge of the boundary any time they're
not walking through it.

And when they're walking through
it, it's modeled as a straight line at various
distances from the source, the assumption
being they weren't doing that for the sole
purpose of getting a radiation exposure. They
were trying to get from Point A to Point B.

So we -- this is relatively easy
math. It's not too hard of a math problem to
estimate what the size of that boundary is,
how long it would take them to walk through there, and what the dose rate would be as they got closer to the source and then further away.

From that average dose rate and the time, we can come up with the dose they would get for that trip through the area, and essentially we just added that up, plus assuming they were standing at the boundary the rest of the time, and came up with a dose estimate for these non-radiographers that were walking through the area. That's the background on this. There's more detail in here, of course.

CHAIRMAN ZIEMER: It's interesting the way this works out. It turns out the non-radiographers end up with a higher dose assignment than the radiographers simply because of the assumption that the others on a regular basis are penetrating into the area rather than observing from the so-called safe distance, but that's the way it works out.
Now can you summarize how you would use this information in terms of claimants from this site?

MR. ALLEN: Yes --

CHAIRMAN ZIEMER: And what has changed since, for example, as compared to previously processed dose reconstruction?

MR. ALLEN: I did want to add I left out one piece of this, and that was the radiation survey around the radiography room in the number six building. There was a survey done around that with the cobalt-60 sources inside.

I took -- there is a maximum dose rate outside the building, plus an average dose rate in various locations, as well as there is a smaller room inside the building for the operators and the dose rates in that room, and I used those dose rates to also come up with a dose estimate for using that building or that room.

I summarized everything at the
bottom of this, you know, and, as you said, you know, the non-radiographer is getting more dose simply because of penetrating the boundary, the safe distance boundary.

So essentially I end up with several different estimates here, radiographers, non-radiographers, also the overhead crane operator, since we did have a survey of the cab of that crane with the cobalt-60 sources exposed.

And the way it would be used now is this is all in the -- well, the radiography room is in the number six building. It's some distance from the betatron building.

Right now, for the non-radiographers in Appendix BB it is based on the stray radiation from the betatron building, assuming they are there the whole time, and that is approximately 1.7 rem per year.

These doses are a little lower, not greatly lower for non-radiographers. It's
-- you've got 1.35 rem. You've got, well, another 1.35 rem. They can't be in two places at once. So essentially the idea with this would be assess doses you would get if you're over in this area walking through these roped off areas or standing near the number six building radiography room or if you're over by the betatron building or if you're working inside the betatron building or if you're working with the castings after they're X-rayed and assess all the possible sources of radiation and then essentially pick the worst case is what it amounts to would be the ultimate goal in revising Appendix BB.

CHAIRMAN ZIEMER: Now let me first ask if there are any questions here on this, and then I have some thoughts on how we proceed relative to this document. Any questions on either the information or the approach that was used in these? Bob, did you have a question?

DR. ANIGSTEIN: Well, I have one
comment, which is basically, you know, for the moment we've -- obviously, we just saw the report --

CHAIRMAN ZIEMER: Right.

DR. ANIGSTEIN: Basically, we haven't reviewed it, certainly not all the documentation. The approach to the cobalt-60 sources seems reasonable.

However, the extrapolating -- back extrapolating that the same practice was followed with the radium sources is something that we, John and I, have a problem accepting because, having looked at some -- documentation that was furnished as part of the -- with the NRC AEC licenses, they suddenly -- back in '62, they suddenly got religion.

They were apparently scolded by the State of Illinois, and we have no records, and there probably are no records, as far as anybody knows, we never will get records from the State of Illinois.
We have no idea what degree of oversight there was, but they were using this fishpole technique with the radium source, which I looked that up, for everybody's information. It's exactly what it sounds like. There would be a long rod with a string and a hook on the end, and they would use that to snag the radium source.

Presumably, the radium source would be in some kind of a shield, open on top, and they would have a little hook on the -- there would be a little eye bolt or something, eyelet on the end, and they would engage that with the hook at the end of the fish pole and lift it out, carry it to wherever it needed to be placed, presumably on the far side of the casting or in the middle of a round casting.

So there was no building. There was no concrete building at that time. Concrete building was built. The film badge -- the NCC firm, the Nuclear Consultant
Corporation, was called in to provide the radiation safety, everything to be in compliance with the AEC rules. Otherwise, they would not get their license.

Prior to that, we have no idea what radiation safety -- I'm being a little facetious to say if any. There must have been some, but what radiation safety they have.

So we cannot say that the same analysis, merely changing the gamma factor and the strength of the source, that the same analysis that was done with a quarter curie cobalt-60 sources would apply to the half curie radium-226 sources. I think that's a dark age there that nothing -- next to nothing is known about. I'm not sure anything.

CHAIRMAN ZIEMER: Well, what is known is that they used the fishpole technique, and the reason for that was it forces a certain distance, so that part is reconstructable.

DR. ANIGSTEIN: Right.

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CHAIRMAN ZIEMER: We also know why the State of Illinois and the NRC required the radium work to cease. It had nothing to with GSI.

This was nationwide in the early sixties, and the reason was radium sources were leaking virtually everywhere because of, presumably, build-up of helium in the source, which is what the alphas become once they give up their energy. So everyone pretty much was required to stop using radium sources nationwide.

So I don't know if there were implications that GSI somehow had poor practices and were being scolded for using radium. Everybody was required pretty much to stop using radium, so that issue -- but you're quite right that we don't know, for example, were they roping off at one and one-half times the distance or whatever. I don't think we know that. Maybe we do, but, in any event, I don't think right now we should debate that so
much as we have the report. We've only had it a couple days.

I know that the petitioner has a number of concerns about this. I have not gone through them, but I have received from Dan, and I believe others have received his comments, maybe just within the last day or so, on the petitioner's concerns.

In fact, from my perspective, I think it may be appropriate for the Work Group to task SC&A to actually do a critical review of this, and maybe the issue that you raised may be one of those issues, and then we can address it.

MEMBER POSTON: At the same time, it makes -- it makes -- it's reasonable to assume, to make those assumptions to give you some indication of what the dose is.

CHAIRMAN ZIEMER: Right. I think as a starting point you use --

MEMBER POSTON: I haven't received any comments from Dan. I had a few questions
that I took them up directly with David.

CHAIRMAN ZIEMER: Right, and I have not -- I have not had a chance to review Dr. McKeel's comments myself.

MEMBER POSTON: Well, my point is I wouldn't dismiss the assumptions out of hand.

CHAIRMAN ZIEMER: Well, no, no, no.

MEMBER POSTON: I agree that we don't know.

CHAIRMAN ZIEMER: I'm just saying --

MEMBER POSTON: It's a reasonable beginning point.

CHAIRMAN ZIEMER: Right, and I've gone through Dave's thing in detail, and I thought in my mind the approach was very reasonable. I like the way you did the traversing through there with a lot of different paths and basically kind of integrating and averaging those results out
and so on.

There certainly can be some questions about the earlier practices, and we may have to deal with that, but, in any event, it seems to me that we would benefit from a chance to all see what the petitioner's concerns are on this approach, to have SC&A have a chance to take a careful look at it if that's agreeable with the Work Group to do that. Let's get some input here.

MEMBER MUNN: Well, I have no disagreement with the current step except that in my perspective what I would like for our contractor to be looking at are things where we feel there might be major glitches or something that's been overlooked or we have concerns with respect to the format, the way the information is presented.

Frankly, I just read through Dave's material. I don't believe I've read Dr. McKeel's comments with respect to it. My personal feeling is that I hesitate to assign
work to the contractor until I feel that what's before us and responses to it are of a significant enough nature that we feel like we need that kind of oversight from the contractor.

I have no objection to that happening. It just seems that it may be an extraneous move if after some consideration of the documentation that we have we feel that it's adequately -- if we all understand it, the purpose of our technical contractor is to try to bring in oversights or shed more light on something that isn't understood by the Board Members technically.

If that's not the case here, then, as I said, I have no objection. It just seems to me that it's a little early for us to do that.

CHAIRMAN ZIEMER: We've got other comments here. Mark and Josie, what are your feelings on that?

MEMBER BEACH: I agree with your
suggestion that SC&A review it. For me, I think that would be helpful.

CHAIRMAN ZIEMER: Mark, what is your --

MEMBER GRIFFON: I agree with that.

CHAIRMAN ZIEMER: John Mauro, did you have a comment?

DR. MAURO: I'll just foreshadow what I see coming in the future. I think that these scenarios, the scenarios as laid out in David's report, perhaps some scenarios that we might look at regarding the fishpole and the kinds of exposures people might have experienced, are all informative in terms of starting to get a sense of what kinds of exposures people might have experienced during this ten-year period where we don't have film badges, and I mentioned this at my last meeting.

When we go through this at our next meeting and we come back with a story,
and everybody will agree, "Yes, those scenarios are pretty good, and those doses look pretty good," I think it's -- I think fundamentally the Work Group and everyone concerned has to eventually come to grips with the sense that here we have a ten-year period.

Non-destructive testing is going on. Sources are being handled, 500 millicuries of radium, 250 millicuries of cobalt during a ten-year period.

The nature of the radiologic controls that were in place were of some question because AEC was not involved at that time. It was more of a state-regulated to the extent to which the state was involved.

The bottom line is we all know that non-destructive testing using radioactive sources is not unusual for there to be some incidents from mishandling and exposures. In fact, I believe there was even one anecdotal story that a source actually was taken home sometime prior to the -- some time -- I don't
remember the time period, but it was --

    DR. ANIGSTEIN: It was probably the radium source.

    DR. MAURO: Perhaps a radium source. What I'm getting at is, you know, everything we do here is going to add value in terms of getting a sense of the magnitude and types of exposures that may have occurred, but in the end, I think we have a very difficult decision to make.

    Is it an acceptable circumstance for a facility to be operating for ten years without film badges and without apparent radiological control oversight and procedures, et cetera that are self-evident from the literature and say that we can reconstruct those doses with sufficient accuracy.

    CHAIRMAN ZIEMER: Any other comments?

    MEMBER POSTON: But you didn't speak to the question. The question was whether or not we should assign SC&A --
DR. MAURO: Oh, I'm sorry.

MEMBER POSTON: -- to review Dave's report.

CHAIRMAN ZIEMER: I think John -- John doesn't have an unbiased view of that.

DR. MAURO: We'd be happy to do that, but I'm saying that after we're done, we're just beginning.

MEMBER MUNN: I think he just made the sales pitch.

DR. MAURO: Oh, no. In fact, I could actually say maybe it's not -- maybe we shouldn't do that. Maybe we should go right to the big issue.

MEMBER POSTON: I don't -- I don't -- I agree with Wanda. I don't think it's a - - it's probably premature because I don't have a clue what Dr. McKeel's comments are on this report. I read it. Technically, I find it pretty solid.

CHAIRMAN ZIEMER: Well, here's one thing that we can do. We're going to be doing
some tasking next week at the full Board meeting. Perhaps I could ask the Work Group members to, between now and next week, amidst all the other documents you will be reviewing, at least to take a look at Dr. McKeel's concerns, and if you haven't had a chance to go through this in detail, look at it, and then we can make a decision on tasking next week.

MEMBER POSTON: Send them to you? Who has the comments? Did you send them to us?

CHAIRMAN ZIEMER: Dr. McKeel, didn't we distribute those? Ted, maybe you did.

MR. KATZ: Maybe not, because I think -- if this is something that came recently and I was already on the road here, then it wouldn't have been distributed yet, but, anyway, I will distribute them as soon as I get back on Thursday.

CHAIRMAN ZIEMER: I know that the
comments came because I got a copy just before I left home. Dr. McKeel, if you're on the line, you sent those out perhaps Monday. Was that correct?

DR. MCKEEL: Well, the -- this is Dan McKeel. I believe I sent my comments on David Allen's White Paper the day after I received it, and then that was sent before the document that I sent about reasons that I thought GSI should get an SEC that we're going to talk about later on.

MEMBER BEACH: So let me ask. Is --

DR. NETON: -- sent on Sunday.

MEMBER BEACH: Is that the 13 points?

MR. KATZ: Did you receive the --

CHAIRMAN ZIEMER: I found it here. Dr. McKeel's email went out at 7:00 on Sunday evening. It was sent to -- it wasn't sent to the Work Group. It was sent -- no, it says it was sent to the Work Group.
DR. NETON: No, no. The distribution I have is --

DR. MCKEEL: -- sent to the Work Group.

DR. NETON: -- was Dr. Ziemer, Ted Katz, Dave Allen, Jim Neton, Stu Hinnefeld.

MR. KATZ: Okay. Well, if I had it on Monday, I would have -- are you looking on your CDC accounts right now?

MEMBER POSTON: No.

MEMBER BEACH: Yes.

MR. KATZ: Okay. Well, that's --

DR. NETON: I received it Sunday at 10:00 p.m.

MR. KATZ: Well, I sent a variety of things from Dr. McKeel on Monday, I believe, so if you look at your CDC accounts, if I had it on Monday, I'm pretty sure I sent it on Monday.

DR. MCKEEL: I don't have all the CDC email addresses.

MR. KATZ: No, no, no, you
wouldn't have them, Dan, but this is something I do.

CHAIRMAN ZIEMER: It did go to Ted. I'm looking at it now. It says that it's addressed to me and the members of the Work Group, but Dan sent it to me, to Ted, to John Mauro, to Dave Allen, Jim Neton, and Stu Hinnefeld.

MEMBER BEACH: Ted sent it to all of us on 5/10. I have it right here.

MR. KATZ: Validation.

MEMBER BEACH: At 6:18 in the morning.

CHAIRMAN ZIEMER: Okay.

MR. KATZ: Thank you.

MEMBER POSTON: My computer is locked up, and I'm trying to get it unlocked.

CHAIRMAN ZIEMER: Okay. Well, would that be agreeable?

MEMBER POSTON: If someone could send me a copy of it to my --

CHAIRMAN ZIEMER: Are you all
agreeable that we'll look at it, and then we can, if we want to proceed with it, ask him to do it next week? Is that -- Josie, is that --

MEMBER BEACH: Yes, that is fine.

CHAIRMAN ZIEMER: Okay. So that's what we will do related to Issue 1, which is the source term summary issue.

DR. MCKEEL: I have one more comment about Issue 1, if I may.

CHAIRMAN ZIEMER: Sure. Please do.

DR. MCKEEL: At the last -- this is Dan McKeel, again, for the court reporter. At the last Work Group, I mentioned and you endorsed the idea that it would be very helpful to get the Illinois State Radiation Device registration records.

And so between February 2 and March 10, I sent a FOIA to the Illinois Department of Public Health, who were the people for which the original legislation was drafted, and they were named as the repository
of those records, and they said -- wrote back very promptly, within 24 hours, and said that years ago those records had been sent to the Illinois Emergency Management Department, the Nuclear Safety Division.

So I then FOIAed that group and spoke to and got an answer, two answers, from their legal department, and then finally on March 10 they said, "Per your recent online FOIA request, the Agency has conducted a search of its files and has found the information attached herein."

Basically, what it was -- I can forward this. I would like to -- well, let me make my -- let me tell you what I got, and then I would make my suggestion. I got three pages of a database printout, and on the last page, which is a different format, it's got the facility number for Granite City Works of United States Steel, which was the old General Steel place.

It said "Location, GSI" on state,
model, and serial number of one of the two betatrons. It says the last inspection date was April 1, 2009, and then below that it has acquisition date, equipment status, junked, and it says last updated 10/08/1993.

So the records are really sort of strange, but it certainly indicates that IEMA did have some radiation records on -- and the equipment is described as application class particle accelerator, so it at least had some information on at least one of the Allis-Chalmers betatrons.

I am sure that what needs to happen -- and I'm going to actually ask NIOSH to please do this or the Board to initiate this. I have been getting records from IEMA Nuclear Safety Division for more than five years now for General Steel and for Dow Madison, and they have produced some documents, but I don't believe they've produced all of the documents that I've asked for, and I really have two choices.
One choice is to file an appeal. The last time I did that on one of my FOIAs to IEMA, it took a year to get the appeal answered, which I finally won, but we don't have a year to waste on this, so I'm going to ask. I think the most expeditious thing is I believe that there are crucial radiation device records at IEMA in Illinois.

One of the things not mentioned today by David Allen was that the NRC records mention that there were at least two conventional x-ray, industrial x-ray devices in use at GSI, so it certainly is possible we can get more source term information from Illinois Emergency Management, and they should have registration records for all of the sources at General Steel.

So the two ways I know to get them are, besides a FOIA appeal, which I think will take too long, will be either to go to IEMA and do a direct data capture, remembering that, you know, there are 19 or 20 covered
sites in the State of Illinois, and that might be very productive for sites other than just General Steel. They might be productive for Dow Madison or any of the other many places in Illinois.

The other possibility is to do what I have urged and requested for years, and that is to write Department of Labor a letter and ask them to please invoke the subpoena power to get those records. I believe that although they have been partly cooperative that IEMA is not being fully cooperative, and I just believe that a little firmer action is needed to get the records that they have, and it could be very productive.

So that's what I wanted to report.

I have at least got some information, but it's not inclusive of all the radiation sources that should have registration records and that we know existed at General Steel during the covered period.

CHAIRMAN ZIEMER: Okay.
DR. MCKEEL: Okay?

CHAIRMAN ZIEMER: Yes, thanks for that suggestion, too, Dan. So on Issue 1, then, we will -- we have agreed to wait until next week to make a final decision on whether or not additional tasking is needed.

In that regard, though, I'm going to ask you again, Dr. McKeel, are you suggesting that there may have been some other sources in the earlier days beyond the radium sources that perhaps the state would have in their registration records that are unknown to us?

DR. MCKEEL: Yes. David Allen's report mentions the fact that we have known for a long time from testimony from several of the General Steel workers and one in particular who filed an affidavit to this effect that there was an iridium-192 source used in the 1950s.

So that was prior to the cobalt-60 licenses, and this gentleman testified that he
used it. Then he went away, I think, to the service and then came back in the fifties a little bit later, and the iridium source was still in use at GSI, and it was clear from him that it was a source that GSI owned.

It then was not there, and he stayed on at GSI for a long time, but it was not there in the sixties, so it's possible that that was an additional source besides the two radium-226 sources in the 1950s, and so that information could be at IEMA.

CHAIRMAN ZIEMER: Now iridium-192 is a byproduct material, and in my mind it therefore could only be there under license.

DR. MCKEEL: I agree with you, but, you know, I asked in both of my 2006 and subsequent FOIA that produced NRC 2010-0012 about all the -- all the byproduct material licenses that would be held by General Steel from 1952 through plant closure in 1973, and what I got was that 1,016 pages that covered 1962 to when the license was terminated,
actually, in January of 1974 after the plant closed.

So I've asked. I've asked twice, and, you know, I didn't get any information of any sources. As you said, the radium-226 weren't licensed by the NRC.

CHAIRMAN ZIEMER: Yes. Is there a

--

DR. MCKEEL: So that's all I know.

CHAIRMAN ZIEMER: Is there a possibility someone with a separate license may have been brought in to do iridium --

DR. MCKEEL: No, we know that [identifying information redacted] and St. Louis Testing Company brought other sources over, and John Ramspott had copied them all to me, extensive communications with [identifying information redacted] in person.

I've talked to [identifying information redacted] and emailed back and forth about the iridium source, and the iridium source, I believe, from this --
particularly one worker's testimony, definitely was owned by GSI, that it was not owned by St. Louis Testing.

CHAIRMAN ZIEMER: Well, it's --

DR. MCKEEL: There is no record in those materials that iridium source was licensed from 1962 to '73.

CHAIRMAN ZIEMER: Well, I might add one other thing here, and I think there is confusion about the iridium issue because the individual that I interviewed, and I won't give that person's name here, Dan, but I think you know who it is --

DR. MCKEEL: Yes. That was a different person.

CHAIRMAN ZIEMER: -- relative to the application of the one and one-half times distance issues --

DR. MCKEEL: Right.

CHAIRMAN ZIEMER: -- when we were trying to get an idea of the source term strength. I was originally talking with him
about the so-called small source, which they identified as being iridium, and he had been — when I asked him to verify my understanding of the interview, and he had talked about this iridium source, and I believe subsequent to that, after he took my draft response or my draft summary and talked with others, and I'm not sure who he talked to, they had concluded that he was incorrect in identifying what he worked with as being iridium, and he changed it to cobalt.

DR. MCKEEL: Well, that's the gentleman you talked to, and I know who that —

CHAIRMAN ZIEMER: Right. All I'm saying is there was some confusion. Clearly, people had some knowledge of an iridium source, but it's not quite clear when and how much it was.

DR. MCKEEL: The individual who gave the affidavit about the iridium was one of the isotope licensed people who was there
all during the 1950s, and he -- I agree with you that there has been confusion, but he was quite definite.

He was the individual, for instance, who provided the film report, film badge report from four quarters of 1962 that preceded the Landauer film badge thing whose report identified NCC, Nuclear Consultants Corporation, as the provider of that film badge report, and so, you know, he is among the most reliable people that has been interviewed.

I don't believe that that gentleman has been interviewed individually. He's still alive. He's still highly helpful, and, you know, he is another person that could be interviewed directly. So that's all I can say about it.

CHAIRMAN ZIEMER: Well --

DR. MCKEEL: That's as far as I can take it.

CHAIRMAN ZIEMER: The other point
I perhaps will make is that even if we are unable to identify through licensee license records exactly whether that was a licensed source or not, I think the scoping process could still and maybe already does encompass those exposures in the sense that if we -- if we made the assumption that the iridium source was there and being used at something comparable to the radium sources in terms of frequency of usage and so on, we could capture that if we don't already. I just think that in general principles, because --

DR. MCKEEL: Well, the comment -- the comment that I would have is the radium sources, as far as I know, in the description of the -- in the license documents we got, I think they were used in the building -- in the building six facility, the radiography facility, so whereas the iridium-192 could have been used in the same place, I think that's less definite where that was used, but, anyway --
MR. RAMSPOTT: Dr. Ziemer?

CHAIRMAN ZIEMER: Yes, sir.

MR. RAMSPOTT: It's John Ramspott, if I may.

CHAIRMAN ZIEMER: Yes.

MR. RAMSPOTT: Dan's point about the six building and the NDT small building being used, I thought the records that Dave Allen was referring to said that was built in '62, so all that time before '62, '53 is really of interest, and the radium sources were -- the radium-226 sources were much earlier sources.

CHAIRMAN ZIEMER: Right.

MR. RAMSPOTT: We saw renewals, I believe, when they were getting rid of radium-226 and going to cobalt. Radium-226 sources were used much earlier. That would mean another good reason, maybe, to go to the state.

CHAIRMAN ZIEMER: Right.

MR. RAMSPOTT: Then the gentleman
that you interviewed who was the Safety Officer, he didn't start at General Steel until 1963.

CHAIRMAN ZIEMER: Right.

MR. RAMSPOTT: So there's a whole ten-year period that he wasn't there, so he couldn't know what sources were there.

CHAIRMAN ZIEMER: I understand. Right.

MR. RAMSPOTT: That's a pretty valid point.

CHAIRMAN ZIEMER: Right. Okay. Thank you.

Mr. RAMSPOTT: Thank you.

CHAIRMAN ZIEMER: Let's look at Issue 2 briefly before we take our lunch break. Issue 2, in our discussion last time, it had to do with the covered period and the fact that DOL had not changed that covered period start date. Dave Allen reported that we had sent -- we being NIOSH -- that the program he sent information about the covered
period to DOL, and I think the question arose as to whether or not they actually got that material, and we had asked that there be some confirmation, that NIOSH confirm with DOL that they have the information that was provided that could impact on when the covered period started, I believe was the issue.

MR. ALLEN: Well, verbally, yes, they have it. What I did since then is I put the letter we sent them, along with attachments, on the common drive that the Board has access to, as well as a Federal Express receipt for that letter.

CHAIRMAN ZIEMER: That shows that they have received the information, and, Bob, a comment?

DR. ANIGSTEIN: I have input on that, and that is I have a -- I don't have it connected to the screen at the moment, but I'll just read it. I downloaded from The New York Times the January 14, 1952 headline, "24 Million Volt Betatron Setup, Chicago, January
"The Army said today that a 24 million volt betatron has been installed at the General Steel Castings Corporation, Granite City, Illinois, for x-raying steel to be used in Army tanks. Betatron is said to be able to penetrate steel castings seven to nine inches in a minute what is being produced -- 14 by 17 inches from the metal."

The point of this is this information from January `52 was widely disseminated, so it is -- it doesn't prove anything, but it's entirely plausible that Mallinckrodt would have known about it and would have taken -- they were -- we know they were doing it in `53. I mean, I admit --

CHAIRMAN ZIEMER: Yes, the issue is not whether the betatron was there and in operation. I think the issue is --

DR. ANIGSTEIN: No, but it was also widely known.

CHAIRMAN ZIEMER: Yes, but the
issue is when the covered period started in terms of the atomic weapons work, which the tanks, Army tanks and stuff --

DR. ANIGSTEIN: I understand. I wasn't --

CHAIRMAN ZIEMER: Yes. No, no.

DR. ANIGSTEIN: -- that here is plausibility that the Mallinckrodt management would have known about this, and why wouldn't this -- if they used it in '53, it's just as likely they used it in '52 is the point.

CHAIRMAN ZIEMER: Well, I don't think it's based on likelihood. It's got to be based on evidence that the contract occurred earlier and --

MR. ALLEN: Any way you look at it, it's DOL has to --

CHAIRMAN ZIEMER: DOL has the information.

DR. ANIGSTEIN: Sure.

CHAIRMAN ZIEMER: That's what we were confirming, so that was the only thing on
Issue 2 that we had to cover.

   DR. ANIGSTEIN: Okay.

   CHAIRMAN ZIEMER: On --

   DR. MCKEEL: Dr. Ziemer?

   CHAIRMAN ZIEMER: Yes.

   DR. MCKEEL: This is Dan McKeel.

   CHAIRMAN ZIEMER: Yes, Dan.

   DR. MCKEEL: I have something that's really directly relevant about confirming information that NIOSH has with Department of Labor, and that is I think there may be a larger problem here.

   I had supplied to some GSI workers a summary of the new information that Mr. Ramspott and I and some of the workers had compiled about General Steel that is not in Appendix BB, and I know we'll be talking about that a little bit later.

   So I took that, and several of those people had apparently sent letters to Department of Labor with that information asking that their cases be reopened, and I got
a letter on May 3 of this year, which I sent to the Work Group, from Rachel Leiton at DEEOIC.

She informed me that whereas that information might be valid, she really wasn't disputing that, but she said in her letter that she had gotten no new -- no information from NIOSH or the Board that was new evidence related to General Steel Industries.

Now, actually, in reading this item, which kind of surprised me, and I remembered it now, that would include the request that NIOSH had sent over to Department of Labor about the covered period. So, anyway, what Rachel Leiton said was that she needed written confirmation from NIOSH and/or the Board that new information had been received by them pertinent to General Steel Industries.

So, you know, I think this procedure of how Department of Labor is notified needs to be worked through, and my
suggestion would be that rather than depending on placement on the O: drive, which seems to be a problematic, that what's really needed is a letter signed by the Board and/or NIOSH directly to Department of Labor and Rachel Leiton explicitly stating what the new information is and asking for a written response back from her, A, that it's been confirmed that she received it, and, number two, you know, whether Department of Labor agrees to accept that and use that in adjudicating claims.

So what the message I got was that all this information that Mr. Ramspott and I and the workers and site experts, people you've interviewed, have been supplying to the Board and to NIOSH for the last five years has not been transmitted to Department of Labor so that it could be used in helping the claims process. That seems to be something that could be easily addressed, and, anyway, I just wanted to give you that input that that seems
to be a big problem that is impeding
Department of Labor, at least, acknowledging
all the work that we've been doing on General
Steel for the last five years.

And this item, it's hard to
confirm that that information on the covered
period has even been confirmed as received by
Department of Labor and acted upon is very
distressing to me. I mean, this has been
going on now for months, and it shouldn't take
that long to get it confirmed by letter, so,
anyway, that's just a -- that's my comment.

CHAIRMAN ZIEMER: Yes, I have a
copy of Rachel Leiton's letter, also. I am
not sure how widely it was distributed. I
understood her comments to mean that they got
-- when they said -- when she said they got no
new information, that everything that was sent
they already had or knew about was how I
interpreted that.

I may have interpreted that
incorrectly, but my understanding is that we
are not relying on things on the O: drive to inform Labor. Labor has -- what was put on the O: drive is a copy of the letter that had already specifically been sent together with a signed receipt showing that the Department of Labor had received the material from NIOSH with the information related to extending the covered period. Dave, am I correct on that?

MR. ALLEN: DOL doesn't have access to that drive.

CHAIRMAN ZIEMER: DOL doesn't have access to the O: drive in any event. That's our internal thing. The point was that Dave had put it on the O: drive to confirm to us both that the material had been sent to Labor and that they had signed a receipt of having received it.

Now, admittedly, we don't know in the bureaucracy. I guess we assume that it's gotten to Rachel, but I don't know if NIOSH folks here or if, you know, Mr. Katz, if you can help us on this. Is there more that -- in
a sense, I don't regard it as a Work Group issue. It might be a Board issue. It's the issue of dealing with another federal agency and making sure that they have the information that's needed to make the decision. I understood from Rachel Leiton's letter that she believed that nothing that was sent was new information to them. I may have --

MR. KATZ: Yes, rather -- I think I read it, too, but, you know, I read it among many things a few days ago. I thought her point was that information she received was not dispositive on the issue.

So it's not that she didn't receive information that might have been new, even. It's just that DOL's consideration of that information did not find that it was dispositive, in other words, that it would change their determination of the, you know, the covered period.

DR. MCKEEL: I agree with Ted that that's what that letter said. It was not
really about the covered period. It was about all of the -- all of the issues that we have worked through with respect to Appendix BB and the SEC.

So, anyway, I think she was saying that it was not dispositive, but to me, I mean, we can talk about that under Item 4(d), but that's preposterous that items that directly affect dose reconstruction would not be dispositive with respect to adjudicating claims which are based on dose reconstruction.

I mean, that's a logical absurdity to me, but, anyway, I just wanted to mention that if there were a problem, I don't know who should communicate new information, but it seems like it should be communicated.

And I would see it the way Ted Katz just said, that she was not disputing that this was important information, just that it was not going to affect the way they adjudicated claims, and I -- but I understood her to be saying until the Board or NIOSH
validated that this information had been, you know, worked through and was now acceptable. And, of course, the real point is where it needs to be added is it needs to be added to a revised TBD -- I mean, to a revised Appendix BB, but we can talk about that later on.

CHAIRMAN ZIEMER: Well, let me just comment that I think Labor's decisions are not dependent on what we put in the TBDs or in Site Profiles because those, in fact, are driven in part by what boundaries are put on us by the decisions made by Labor and DOE in those determinations.

There already is a practice that NIOSH has. If they discover documents that suggest that the covered period should be different, those don't even necessarily come to the Board. They go -- they notify Department of Labor directly, and that is a regular practice.

It's my understanding that if documents surface that suggest that the
covered period should be extended in some way, those documents -- that documentation is made known at once to Department of Labor, so there is no requirement. In fact, it's not a practice that the Board has to agree that a covered period should be changed. That's --

DR. MCKEEL: My letter had nothing to do with the covered period. It had to do with Appendix BB-related issues.

CHAIRMAN ZIEMER: Per se, yes, but we did have the --

DR. MCKEEL: I understand what you're saying.

CHAIRMAN ZIEMER: Yes, this particular thing, we wanted to confirm that --

DR. MCKEEL: Yes, sir. I agree.

CHAIRMAN ZIEMER: -- that, that Labor had gotten that information.

DR. MCKEEL: All right. I agree, and thank you for the explanation.

CHAIRMAN ZIEMER: I think it's time for our lunch break now, so we'll break.
I think an hour is enough for lunch, and we'll come back promptly at 1:00 and resume our deliberation.

MR. KATZ: Thank you. Thank everyone on the phone, and we'll reconnect at 1:00.

(Whereupon, the above-entitled matter went off the record at 12:03 p.m. and resumed at 1:08 p.m.)
1:08 p.m.

MR. KATZ: So welcome back, everyone, to the Advisory Board of Radiation and Worker Health, the TBD-6000 Work Group. We're just reconvening after lunch.

Let's just check on the line to see -- Henry Anderson, Dr. Anderson, do we have you with us again?

(No response.)

MR. KATZ: And how about the petitioner and site expert?

DR. MCKEEL: I'm here. This is Dan McKeel.

MR. RAMSPOTT: I'm here. This is John Ramspott.

MR. KATZ: Welcome back.

CHAIRMAN ZIEMER: Okay, I think we're ready to proceed. My notes on issues 3 to 11 of Appendix BB was to ask the question
of what will the impact of the new issue 1 information have on these issues.

Let me review for you what issues 3 to 11 deal with and then I'll ask Dave Allen for a very general response because we may need to get some specificity.

Issue 3 had to do with the underestimate of beta beam intensity.

Incidentally, let me insert here that before -- I'm not sure we had all the NIOSH responses to all of these, but they were related to source term information that now may have changed somewhat, so the responses may change.

Issue 4 had to do with an underestimate of stray radiation from the betatron. Now, the betatron source term hasn't changed, so that issue may not change for you unless there was something in the surveys that changed that.

MR. ALLEN: Well, there's been several pieces of information that he wants us
to --

CHAIRMAN ZIEMER: That have come up since so -- okay.

MR. ALLEN: One batch.

CHAIRMAN ZIEMER: Right, okay so, anyway that's what issue 4 had to do with.

Issue 5 had failure to assess other radiography sources. Well, in part, or maybe in full, that's at least addressed by the new source term information.

Neglect of skin dose from activated steel was the next one.

The seventh one was an underestimate of exposure to activated betatron apparatus.

And, Number 8 was underestimate of work hours. That was the 40-hour week versus the 60. The ninth one had to do with mis-characterization of steel work practices. Issue 10 had to do with errors in calculating dose rates from uranium. And, Issue 11 dealt with underestimate of doses to other workers.
So all of those things are the items that we said last time we need to know what the impact of the new information would have on those outcomes.

Now, at the time of our last meeting, we were aware of this new set of documents that have been discovered by the petitioner, but we weren't aware of the impact they would have on these other items.

So we do need to -- and I'm not thinking we would do that today -- but I think we need to know if anything has changed in those matrix items with this new information.

MR. ALLEN: I think some has -- very aware that the source --

CHAIRMAN ZIEMER: Right.

MR. ALLEN: Isotopic sources, some White Papers describe all that information. There's also some information on the betatron building site.

CHAIRMAN ZIEMER: Right.

MR. ALLEN: The drawings we were
relying on before came from photographic surveys.

CHAIRMAN ZIEMER: Right. We have those other drawings now, too.

MR. ALLEN: Now we have drawings that dimension them.

CHAIRMAN ZIEMER: Right.

MR. ALLEN: Also some shielding wall in the new betatron building on those drawings that was not in the FUSRAP surveys. I don't know if that was just omitted as not necessary or if that wall disappeared before 1990 when they did the survey. I simply don't know, but there is a thicker concrete wall.

CHAIRMAN ZIEMER: Back up a little bit. There's a big difference between the old betatron building and the new betatron building so much in the --

MR. ALLEN: Right.

CHAIRMAN ZIEMER: It extends in the upward corridor in the old building and it stops pretty much at the shielding room on the
new betatron building.

These drawings show the ten-foot thick wall stops there but then there's a concrete wall bearing thickness as it turns the corner and the thickness goes to four feet.

MR. ALLEN: I believe our reaction last time was that any or all of these items might change with the new information.

CHAIRMAN ZIEMER: Yes.

MR. ALLEN: So what I'd like to suggest if it's agreeable to the Work Group is that we ask NIOSH to now go back to their previous responses and make whatever modifications need to be made on these issues so that we -- because we want to close them in terms of current information. We don't want to deal with them based on old information which is no longer pertinent.

If you say this item -- this issue doesn't change because of something other than -- fine, then we proceed.
But I think in terms of our own time and being systematic on this, if we could go back to each of those and see what the response is now that you have the new service information. Would that be appropriate?

CHAIRMAN ZIEMER: Yes, I think we can do that.

MR. ALLEN: I was going to say that there's been so much new information between film badges to NRC documents and --

CHAIRMAN ZIEMER: Right.

MR. ALLEN: And new information from workers.

CHAIRMAN ZIEMER: Well, your responses might have changed substantially from the finding. I think the finding may still be appropriate to address, but the answers might be very different now.

MR. ALLEN: Yes. Some of those findings might be moot now.

CHAIRMAN ZIEMER: They may be moot and that's fine too.
MR. ALLEN: I mean, they might -- the solution might raise --

CHAIRMAN ZIEMER: Right, right. So I think it's appropriate to systematically go through each of those original findings and indicate how you would answer them in terms of the current information.

So that would be our recommendation, I think, to NIOSH. We don't task them, but we certainly can -- we're certainly aware that the response to the matrix has to have changed in some respects with regard to the new source term-related information.

Any other questions on items 3 through 11?

DR. MAURO: Excuse me, Paul? When you make reference to that, do you include some of the analysis that we provide in our report because our findings, you know, we've sort of laid out a lot of places where assumptions made -- these assumptions, those
assumptions -- in other words, where we laid out alternative approaches that may be considered -- have new distances in occupancy times and number of shots.

I mean, in other words, what I'm getting at is that there's new information that Dan McKeel, of course, has been providing. There is information that we provided by way of our own analysis in the situation. So there is really a fairly long collection --

CHAIRMAN ZIEMER: Well, they have all of that.

DR. MAURO: And they have all -- but that's where you're going with it?

CHAIRMAN ZIEMER: Yes, yes.

DR. MAURO: Okay. It's the whole --

CHAIRMAN ZIEMER: Sure. Yes, yes.

DR. MAURO: Okay.

CHAIRMAN ZIEMER: So issues 3 through 11 need to be addressed in terms of the current status of the information.
Issue 12 was the contamination-resuspension issue, which is sort of the same issue as we had in TBD-6000 itself. So that's one that goes back to the original transfer to the other -- to the Subcommittee. Well, it's the same issue, I think.

MEMBER MUNN: It is. Yes, I think it is.

CHAIRMAN ZIEMER: Right.

MEMBER MUNN: It certainly appears to be at this point.

CHAIRMAN ZIEMER: Issue 13 was use of incorrect units. I'm not sure if that's an important issue in terms of dose reconstruction because we know that all the reports always talked about dose in roentgens and roentgen is not a dose unit. It's an exposure unit. Rads and rems came along later.

It's a technical-clarity issue, but for example, if you're reporting on what an old report said and you know the roentgens,
that's how you report it.

If you wanted to be up to date, we
got to get into sieverts and grays and so on.

Anyway, there's some other things
there that talked about air kerma and
millirads and so on. But these are sort of
technical edits that can be made as needed, I
think.

I don't think the Work Group needs
to deal with that, per se, except that --

MEMBER MUNN: NIOSH has accepted it
and said they'll change it in the future and
they haven't, so --

CHAIRMAN ZIEMER: Right.

DR. ANIGSTEIN: The issue is,
besides technical correctness is also that if
they use the OCAS 1, there's a different dose-
conversion factor.

Basically, it ends up with dose to
a given organ. That's the final analysis.

CHAIRMAN ZIEMER: Right.

DR. ANIGSTEIN: There are different
dose-conversion factors for exposure and for HD10 and for, I believe there's also one for effective dose. Both reconstructors need to know which of these three tables to use.

CHAIRMAN ZIEMER: Is that something, maybe, to be clarified -- I don't recall the details on that -- was there uncertainty as to which table --

DR. NETON: I think what Bob's pointing out is that, aside from the fact that we need identifiable -- really, what we mean -- it's important to identify what it really is because dose reconstructors may rely on that unit to do a conversion. External -- That's based on the ICR.

Whether you're converting from an exposure measurement in here to an organ dose or -- it makes a big difference.

CHAIRMAN ZIEMER: Right.

DR. NETON: Some difference.

DR. MAURO: It's a -- I would say it's a marginal issue compared to these other
matters.

DR. NETON: I think we acknowledged it.

CHAIRMAN ZIEMER: Right.

MEMBER MUNN: But its use, then, in dose reconstruction would seem to place additional priority on getting at least that portion of appendix revision done, would it not?

DR. NETON: I'm not certain that -- even though the text might indicate that, I think that where the rubber meets the road, dose reconstructors -- I expect they're using the right conversions.

CHAIRMAN ZIEMER: Well, all we need then is to point out what is done in practice aside from the terms in the Appendix itself to give assurance that the correct conversions are being used in the dose reconstruction process.

MEMBER MUNN: Perhaps we could add that to the NIOSH response.
CHAIRMAN ZIEMER: Right.

DR. ANIGSTEIN: That meeting is not accessible on disk. In the actual standards, there are places MCNP was used to calculate rads that other places where roentgen were calculated.

So there were -- it's not just the same -- okay, translated -- there are changes, because there actually were mixed units in the analyses themselves and not just in the write-up.

So there needs to be a little -- it's not a major job, but there needs to be a little work done to unify that.

CHAIRMAN ZIEMER: Okay. I want to move on to item D, which is the petitioner's document. The title of that document is Reasons the TBD-6000 Work Group Should Recommend an SEC for GSI and Appendix BB and TBD-6000 Needs to be Revised by NIOSH.

So if you will pull that out. What I would like to do is the following -- Dr.
McKeel has numbered the items. I believe there are 13 of those items, the first of which we've actually already discussed. That was on TBD-6000. I think we've discussed that one already.

But starting with item 2 on through and what I would propose doing is -- over the weekend, I developed some comments of my own and I want to share those with you.

My comments are intended -- I'm not suggesting what the Work Group's positions should be so much as trying to stimulate your thoughts on these items. Feel free to shoot down whatever I say. These are just some discussion points.

We'll allow the petitioner also to add to or respond to what I will characterize as my sort of initial responses to the items.

One, you're looking like you're having trouble finding the documents.

MEMBER MUNN: Yes, I am. The date of this?
CHAIRMAN ZIEMER: I think Dr. McKeel distributed this.

MEMBER MUNN: Oh, in your red and white?

CHAIRMAN ZIEMER: The red and white.

MEMBER MUNN: Got it.

CHAIRMAN ZIEMER: Dr. McKeel's document -- you have the original copy there? Okay, so it cites specific Appendix BB items is where I'm starting. In his item 2 on the unresolved SC&A findings on Appendix BB and so on, the comment says that collection of SC&A analysis was a GSI external radiation doses have been grossly underestimated by NIOSH.

This comment includes, via reference, all of the GSI SEC00105 co-petitioner McKeel's previous public comments at Board meetings in the TBD-6000 Work Group transcripts. This formal critique posted on the OCAS web site and comments to NIOSH thereon.
My initial comment is, 1) the Work Group has not specifically agreed to or accepted the SC&A analysis or assertions that the external doses have been grossly underestimated.

Just as a starting point, we have not agreed -- nor have we disagreed -- but we have not agreed with that position necessarily.

Of course, NIOSH now has provided -- updated the external dose reconstruction figures based on this new source term information that's been provided.

So in my mind, what would need to happen and what we might decide to do next week is for SC&A to re-evaluate these recommendations in this NIOSH White Paper and perhaps critique that, because I don't know if SC&A's comments are still the way they're characterized here or not as the dose is being grossly underestimated and so on. That's my initial comment on that.
John, you --

DR. MAURO: Yes. You said a couple of things that sort of compounded together in what you just described.

There's a number of comments we have that go back to our original review of the work done on Appendix BB and there is a lot of discussion we reviewed that errors were made, assumptions would be different, and that sort of thing.

Then of course, there is the recent report that just came out dealing with external exposures from sources, which is really new information on dealing with this new matter of how we're going to deal with -- now, I see that as separate.

In other words, that's a stand-alone issue and as I understand it, we decided in Buffalo to do anything on that. Is that right? Do we have an official green light?

CHAIRMAN ZIEMER: Yes.

DR. MAURO: I guess what this --
all these other matters deal with basically
Bob's comments on language -- you know, the
betatron model was run and all those
assumptions. I guess I'm not quite sure. Is
there anything else you need from us related
to that?

I mean, that's now on the record.
I don't know if there's anything that we said
that changes, in light of everything we've
learned --

DR. ANIGSTEIN: No. I'd like to
just interject.

DR. MAURO: Sure, please.

DR. ANIGSTEIN: I don't know if
it's clear and I doubt if it's clear to
everyone, the purpose of the report that we
issued back in the uncleared version in March
and the cleared version in April of 2008 was
not to say we have the answer.

This is the way the betatron
upgraded 100 percent of the time and
therefore, we can use all of this as the
calculated doses.

The purpose was to show, here are some scenarios that NIOSH overlooked of the betatron shooting the casting of the railroad tracks of the exposure in the restroom, which was -- actually, there wasn't one condition under which you could draw a straight line from the corner of the restroom to the bigger target with nothing being in between except some light sheet metal and light concrete.

True, it was not the correct beam. It would be a different number of the beam, but nevertheless, there would be -- so these were examples of things that should be looked at.

We didn't say this is always the case. We also didn't say that these are the worst conditions. We didn't look at every single possible geometry. We're so limited by time. These summaries run very long.

So I could imagine intuitively that there could have been worse geometry.
For instance, we had the beam being horizontal -- pointed horizontal at this large round casting, length of a shovel. The beam could have been underneath pointing up at a 45 -- I was told it never points straight up. It could be at a 45-degree angle. It would have to be to get all the -- as a matter of fact, I have a picture of that here.

We have to get this thing -- Jim, you seem to be the expert on this -- how to get this thing started. At least, Dave said you are.

DR. NETON: Turn it on.

DR. ANIGSTEIN: It's on, but I have no idea how to activate it -- how to get the projector to talk to the laptop.

CHAIRMAN ZIEMER: You may have to push F7 or F8 button to -- F7 or F8 usually sends the signal.

DR. ANIGSTEIN: I think it's function F8.

DR. NETON: You've got to get the
light working. The light is not on. I just
turned it on.

DR. ANIGSTEIN: Okay, now this --

CHAIRMAN ZIEMER: For those on the
phone, Bob is starting to show us a picture
here which you'll be familiar with, but we
don't -- a big shot, Bob, of what?

DR. ANIGSTEIN: Let me get it.

There we go.

CHAIRMAN ZIEMER: We all have
pictures of this ourselves.

DR. ANIGSTEIN: This is in the SC&A
report, Figure 19.

CHAIRMAN ZIEMER: Right.

DR. ANIGSTEIN: So I just made a
copy here. I did it for a different -- I mean,
I had to key up for a different reason, but as
long as we're at it, what it shows is they're
going to need to take from different angles.

You're going to have to put a film
inside here and so it's got to be shooting --
in our model, we're shooting horizontal.
We're also going to have to shoot up like this because I don't think we're going to get all the different pieces of it.

So I'm just saying that there are many, many situations -- and we only picked a couple as not necessarily worst case, not average case -- just an example of something that was not included in the original.

We did so to say, well, our estimate is 13.6 per year and imagine the estimate is lower. That's assuming this would be 100 percent of the time and we don't claim it is.

CHAIRMAN ZIEMER: Well, I think the overall thrust -- and Dan can clarify -- the overall thrust of the second comment here is not specifically on that one issue, but it was in general that we need resolution on all of the SC&A findings in Appendix BB. That's number one.

And oh, by the way, many of the estimates of SC&A seem to be higher than
NIOSH, so there was that discrepancy that was pointed out.

But I think Dr. McKeel, I believe, is emphasizing the need to resolve these items that are in the matrix and I think we agreed to that. NIOSH has agreed that they're going to come back with new information, certainly on items 3 through 11, which are the bulk of these, so we will have that new information.

But let me pause and ask Dr. McKeel if I have understood his comment correctly?

DR. MCKEEL: Hi, Dr. Ziemer. This is Dan McKeel.

Yes, you've got it exactly right. I wasn't making any specific point other than there were some really serious findings that need to be resolved.

They all need to be resolved and then Appendix B can move on. The corollary of that and the concern is that once those things are resolved, then Appendix BB desperately
needs to be revised, so exactly right.

CHAIRMAN ZIEMER: Okay, thank you.

Let's move on to the third item, which was unresolved SC&A findings for the SEC 00105 Evaluation Report.

Dr. McKeel points out that the findings included review of two GSI cases with major technical errors. These cases were important to the Dose Reconstruction Subcommittee and he points out he's got no results of that referral.

And then it says one major finding by SC&A was that NIOSH methods on all of those reconstruction were scientifically flawed. This finding, in and of itself, is sufficient for the TBD-6000 Work Group and full Board to recommend overturning NIOSH's recommendation to deny 00105 in recommending SEC.

My initial comment is that neither this Work Group nor the Board has so far agreed that the NIOSH methods are all scientifically flawed.
The fact that -- I'm not sure --
Dr. McKeel, you can clarify in a moment -- I'm
not sure if you were talking about just the
dose reconstruction from General Steel or all
dose reconstruction.

But I did want to note that it's
very common in dose reconstruction cases and
cases reviewed by our contractor, SC&A, to
find what I would call technical issues or
what we call findings in terms of our
evaluation process or the Board's evaluation
process of dose reconstruction.

In most of the cases reviewed to
date, these technical errors have not risen to
the level where there would be a change in the
compensation decision.

I believe that in the few cases
where perhaps it was identified that it could
affect the compensation decision, the burden
is on NIOSH to address the individual case,
not on the Work Group.

And the Board doesn't review the
individual cases per se -- for example, what
you might call appeal. That's my initial
comment on that.

Maybe I'll ask Dr. McKeel, though, to clarify. When you talked about all cases being flawed, were you referring to all dose reconstructions or specifically to General Steel?

DR. MCKEEL: Dr. Ziemer, this is Dan McKeel. There is a finding in a particular -- I think the last time that I addressed the Board about that, that entered the record specifically.

SC&A was referring to -- I believe the term they used was all GSI dose reconstructions done to date.

I've read an awful lot of SEC evaluation reports and I cannot remember ever hearing a statement that strong. So my point was that as a departure point, Dr. Anigstein picked two cases that illustrated SC&A's problem with the way dose reconstruction had
been performed.

Of course, I understand that the Board has not made a final determination and that's why Items 2 and 3 start off with unresolved findings.

But what my point was is that I understand very well that rarely have your dose reconstruction reviews resulted in a change to the Probability of Causation toward compensation and so forth. And here were two cases that were so troublesome -- and it is clear that they were troublesome, at least to SC&A, who went on for several pages describing what was wrong specifically, and those two cases have not really been examined yet. They haven't been defended by NIOSH and they really haven't been scrutinized by the Board.

So I felt that one possibility might be, besides any other deliberation, would be to bring those two cases to the attention of the Dose Reconstruction Subcommittee and perhaps, since those cases
are not a random sample, but are two cases
that are singled out by SC&A as having major
problems that -- that might be two cases that
could be recommended.

The rest of that comment speaks of
another person who contacted me recently who
is from GSI whose Probability of Causation was
49.14 percent with lung cancer and is in there
the entire covered period.

So I was merely suggesting that
that would be another case that would be
excellent to have dose reconstruction done.
That may be a perfectly appropriate
Probability of Causation, but I'm just trying
to make the work of the Dose Reconstruction
Subcommittee examine cases that are, number
one, really close to the compensation line
because our contention -- I'm talking about
petitioners, the advocates, the workers, the
claimants from GSI -- is that they're a very
large number of pieces of new information,
including the average work week change, that
need to be incorporated in dose reconstruction. We're not clear that they have been. Certainly, Appendix BB has never been revised.

So that was the point of trying to flag those cases. That's all.

CHAIRMAN ZIEMER: Okay, that's helpful. Ted Katz has a comment.

MR. KATZ: A couple things related to his request about the Dose Reconstruction Subcommittee, for one.

Can I ask -- someone on the line is washing dishes or something and if you could put your phone on mute. It's not impossible for us to make out what Dan is saying, but it might be worse for other people on the phone.

The cases, I believe, that are referred to are cases that are anted up for the Dose Reconstruction Subcommittee to review. There's a process by which they go about that.
They review those in sets and they are pretty far along now because the twelfth set, which is -- right -- the most current, has already been assigned for a sort of further investigatory process that goes on between SC&A and Board members. So those are pretty far along, but those are in process. Those would be in process then for having sort of a final evaluation ready for the Board to consider with respect to those cases, right?

MEMBER GRIFFON: You're saying if --

MR. KATZ: The particular cases that he mentioned are ones that SC&A reviewed as part of the dose reconstruction review process. That's my point.

MEMBER GRIFFON: I didn't know that.

MR. KATZ: So Dan, that will -- in the normal course of business, those cases will be sort of fully evaluated by the subcommittee.
DR. MCKEEL: Ted, I -- this is Dan McKeel again.

I appreciate your efforts in flagging those cases and identifying that they were already an existing set.

What I was trying to say in this comment about the SEC is that I think it's extremely important that, once they are reviewed, that that information be fed back to this particular Work Group to consider along with their own deliberations on those two cases, which I assume in time will be examined and looked at.

MR. KATZ: Right.

DR. MCKEEL: That's really what I was trying to do was to make that connection between those two cases.

MR. KATZ: Right. Thanks, Dan. I think that's easy to do, but Mark Griffon is actually the chair of that subcommittee that does the dose reconstruction reviews.

DR. MCKEEL: All right, thank you.
MR. KATZ: Though he sits on this one.

CHAIRMAN ZIEMER: This is Ziemer again. I want to sort of emphasize something in terms of our own internal procedures recognizing you already have -- these cases have been reviewed before and all that SC&A had done was gone back and said have we reviewed some GSI cases in the past and what were our comments on those?

So those do automatically get resolved in the system and the Work Group, that is, the Subcommittee, the Dose Reconstruction Subcommittee, is reviewing those as part of their normal review process.

If they find that procedurally, there's something in error because there's a resolution process there too -- if the doses were reconstructed in error, those get taken care of by NIOSH through a feedback process.

If it's found that there's information -- something has changed that
should have been considered -- maybe a
shortcoming in, let's say, Appendix BB, that
information could be fed back.

The other part of it is, if
Appendix BB changes and there's a new work
week or number of hours used or there's a
change in other parameters, all previous dose
reconstruction done under the old system would
get re-evaluated to determine whether or not
any new findings affect the Probability of
Causation, so that's all part of the process.

The main thing I wanted to
emphasize, particularly on a specific case
that you mentioned and I'm not going to give
either the DOL file number or the person's
name, but it's mentioned in your document,
Dan. You understand that neither this group,
nor the Dose Reconstruction Subcommittee, nor
the Board -- we are not an appeals committee
and would not look at that case as a specific
case.

What we would do would be if,
let's say procedures or other information that fed into the dose reconstruction for those kinds of cases changed how dose reconstruction is done, then all of those cases -- and we would not pick out a case to go back to the Board and say this person we think you should redo. We wouldn't tell NIOSH that. They would redo all cases that had been previously considered whether or not they're close to 50 percent or whether they're -- well, we don't know -- whatever they are.

So the Work Group can certainly make recommendations on any issue that affects dose reconstruction. For example, should a different work week length be considered? Should a different source term be considered? Should the Putzier effect be considered? All of these things that might affect these -- so we have to approach it in a generic way.

I think you understand that, Dr. McKeel. We won't review that specific case. I don't even know if that's one of the cases
that's reviewed and we couldn't reveal that anyway.

In any event, we will -- this Board will not review that particular case as a specific case. I believe that's correct from a legal point of view and I'll ask counsel if I'm not correct on that. We cannot take action on that specific case as an individual case. We would address all of these as GSI dose reconstruction cases.

DR. MCKEEL: Dr. Ziemer, this is Dan McKeel. I definitely understand all the things you just said.

However, about that last case -- and I understand that you're not an appeals board, you don't adjudicate individual cases. On the other hand, what you do do, is somebody has a list, a pool of candidate cases for the Dose Reconstruction Subcommittee, and out of those you do pick them. I've heard many of those discussions.

For example, cases -- if I were
doing that, if I were in your position, I would be extremely interested in looking at a case that came that close to the Probability of Causation of a person who has lung cancer, which is a highly compensated cancer and who is at the work site for 30 years, knowing the fact that 30 percent of the people there have already gotten compensated on dose reconstruction.

So just as a Board member or a Subcommittee member, I might wonder how come this person wasn't compensated?

CHAIRMAN ZIEMER: You're quite right there and in fact --

DR. MCKEEL: That's the only reason I flagged that -- that there was a constellation of findings that, a priori, which I understand is not the way the process is done -- you might think that person would be compensated. That's all.

CHAIRMAN ZIEMER: Yes, you're quite right. In fact, you'll notice in the more
recent selections a fair amount of attention to cases -- Mark, you can maybe speak to this -- but cases that are very close but under 50 percent, there has been an intentional selection of many of those.

We obviously can't do 100 percent of them, but we do try to both find cases that are very close to 50 percent and cases from a variety of facilities to ask the very question you're asking.

So indeed there is some intention in that regard. Again, at that point, we're looking at them, without identification of -- we do identify by site and by Probability of Causation and type of cancer, so we have that information, but not by individual names.

But you're quite right. If you are a Board member, you would do that. If we were Board members, and we are, we would do that and we do and we are, so your point is well made.

DR. MCKEEL: Thank you.
CHAIRMAN ZIEMER: A comment --

Wanda?

MEMBER MUNN: One other comment that perhaps should be made very clear. Even if the case that's being discussed specifically here were to be among those that we were reviewing in dose reconstruction and if there were, in fact, as a result of any information that came forward re-calculations on groups by NIOSH, it is -- this Board would not be advising advocacy groups of the fact that that had occurred -- only the claimant would occur.

CHAIRMAN ZIEMER: Yes. In fact, we would not necessarily know that that had occurred.

MEMBER MUNN: Precisely. There was an exchange earlier during this conversation where I believe I heard a request that if this case or those like it were reviewed, that the advocate be made aware that they had been.

I just want to make it very clear
that it's not possible for us to do that. It would not be done. The claimant would be advised.

DR. MCKEEL: This Dan McKeel. No, that's not what I was asking because I understand that that cannot be done.

What I was saying was however, that it does -- that if it's possible, it would be useful if the Work Group -- these two cases have been singled out in an SEC evaluation report as having extremely flawed methodology. SC&A pointed that out.

It seems to me that that finding on these two cases needs to be resolved. It seems to me that one piece of data that would help resolve that would be if the Work Group -- now I'm talking about could be privy in a generic sense or whatever sense, without knowing the person's name -- that's immaterial -- or their identifying information. That's immaterial.

But if they could be -- if they
could learn the purpose of the Dose Reconstruction Subcommittee review, that would be extremely helpful and I am aware of the long discussions you all have had of justifying to the HHS Secretary exactly what the utility of those dose reconstruction reviews is.

It seems to me that one of the utilities is certainly to -- I mean, the main purpose is a quality-control measure.

So if your contractor picks two cases, from what Dr. Ziemer said if I understand it correctly, if those two cases have already been examined by the Dose Reconstruction Committee and they were found not to have a problem and then SC&A reviews them for another purpose and says there are major problems, then that's an internal quality-control problem.

Anyway, look, I'm not trying to tell you all how to do your job. I'm just flagging those two cases. I would notice the
petitioner that I'm not aware that those two cases have been ever discussed at the Work Group level and a very simple thing I was trying to do was to point out that that is a finding on the SEC and that I'm hoping that that will be looked at and resolved. That is all.

CHAIRMAN ZIEMER: Yes. Dan, let me clarify because you may have misunderstood. These cases were never approved in advance by the Dose Reconstruction Committee.

These cases were done by NIOSH and the claims were closed. It's after that that we review. We review closed claims. All of the claims that we look at in the Dose Reconstruction Subcommittee are cases that have come to closure. They've gone back to DOL and the case has either been awarded or denied.

DR. MCKEEL: I understand that.

CHAIRMAN ZIEMER: So we never looked at it. So the findings of SC&A are part
of our review of those, so if these are not
claims that the Board has said are -- that
meet muster and have later been reviewed and
found not to be. This is our first look at
those.

DR. MCKEEL: Okay.

CHAIRMAN ZIEMER: With the help of
our contractors.

DR. MCKEEL: That's fine.

CHAIRMAN ZIEMER: And, in fact, now
it is the Dose Reconstruction Subcommittee's
job to take that information and either say,
no, wait a minute. You're wrong and here's why
or, yes, you're right and we agree. If there's
an issue, that feeds back into the system.

It may either have to cause a
change by how the dose reconstructions are
done. I mean, they could be something as
simple as a miscalculation by a reconstructor
or it could be something that's flawed in the
whole process.

As you indicated, maybe, if it's
something like the Appendix that's relied on for dose reconstruction in these cases needs to be revised and that feeds back to us, so there's an opportunity now for the Dose Reconstruction Subcommittee to feed the findings back.

So indeed, what you're talking about as an objective is exactly the way the system is supposed to work. So we're with you on that. I just want to make clear that it is not something that had been previously approved and now is being said is flawed.

The only sense in which it was closed was that the claim was closed by NIOSH and Labor and is now subject to our review. That's the point at which we step in.

DR. MCKEEL: That's the way I had understood it.

CHAIRMAN ZIEMER: Okay. Let's move on, shall we. How are we doing on time? We're good.

That was item 3. Item 4 was the
film badge data, the lack of film badge data. Reference is made to the uranium purchase orders, reference made to John Mauro's citation that the Work Group had not yet acted on that information. The findings merit immediate recommendation from the Work Group to the full Board to approve the SEC.

Well, my initial comment was there are some film badge data and we recognize that. We do have the Landauer data, so it's not -- it's the early period that I think we probably focused on in terms of the SC&A remark.

But in cases where the film badges are more claimant-favorable, of course, those could be used. But there's many cases where we don't have film badge records -- the early years here at GSI are one of those -- and if they don't exist or haven't been recovered, then the DR reviews do permit reconstructing doses from source term data.

Now, we still have to deal with
the issue of reliability of source term data
and related practices in the early years for
example, so that's still an open question.

But I believe as a Work Group, we
still feel, in terms of our charge and what
we're compelled to do, is to deal with the
information we have. The lack of film badge
data itself is insufficient to say that we
should automatically declare this to be a SEC
class, in my judgment.

The statement that there's no
remedy in sight; I guess I would not agree
with that. Maybe I'll change my mind as we
proceed, but I think there are some endpoints
in site.

Certainly at some time down the
road and perhaps fairly soon, if we can
clarify the early years, we could make a
decision on whether or not we have enough
information to reconstruct dose from source
terms or not. But either way, there is a
remedy in sight, I believe.
That's my initial comment on that.

Others have reactions or --?

MEMBER GRIFFON: I just agree.

CHAIRMAN ZIEMER: Dan, do you have additional comment on that one?

DR. MCKEEL: Yes, sir. One is that comment four is related to the lack of film badge data and purchase orders for 1953.

CHAIRMAN ZIEMER: The early years, yes.

DR. MCKEEL: The other comment is not just I, but John Mauro in a previous Work Group session and at this Work Group session has said that for SC&A at the present moment where things stand, that's going to be a major problem down the road.

What I meant by no remedy in sight is if somebody comes up with a new strategy or like the 45 boxes of classified material that is now being examined to see if it's relevant to Dow, you know, unless somebody comes up with a sudden new find, that's what I meant --
that there is no remedy in site for obtaining
the film badge data or the purchase orders for
1953 to 1963.

We've been to the Department of
Energy and they say they have exhausted their
resources in doing so. So that's the context
that I made that comment.

Of course, when and if whatever
recommendation you're going to make is
entirely up to the Work Group, but I was
saying that to me, based on what's done at
other places, and this is just my opinion, but
I think we are at the point where we have no
data, no monitoring data, no real monitoring
data for 10 of the 13 years of the covered
period.

Obviously, NIOSH has made some
determination that they're able to back-
extrapolate existing data to that period of
time and so forth. But I'm expressing my
opinion as co-petitioner.

CHAIRMAN ZIEMER: Okay, and that's
fine. We appreciate that.

Of course, I'm going to suggest that we at least take a look at what NIOSH presents the next time we're able to deal with the Appendix BB issue. It may be that we'll be at the point then that we can more clearly see what to do on the earlier years.

I quite agree. I don't think we're going to sit and say, well, let's wait and see if somebody finds additional data. In my mind, we have to go pretty much with what we have now in terms of source term and in monitoring or lack thereof.

NIOSH will have to make a final sort of ascertainment as to whether or not they believe they can reconstruct dose based on present source term information and then we will either have to agree or disagree that that can be done in a manner that fairly bounds things and see from there.

MEMBER GRIFFON: I'm sorry. What is NIOSH's approach now -- the current, on the
books for this?

    MR. ALLEN: In Appendix BB, you mean?

    MEMBER GRIFFON: Yes.

    MR. ALLEN: For a particular time period?

    MEMBER GRIFFON: External dose for this early time, yes.

    MR. ALLEN: Appendix BB is a model dose based largely on the betatron machine and there's an activation product, uranium and activation steel.

    MEMBER GRIFFON: And you've made certain assumptions on occupancy factors and things like that, right?

    MR. ALLEN: Yes.

    CHAIRMAN ZIEMER: Well, the betatrons, in my mind, although they are complex, they're a little easier to characterize.

        I mean, it would be hard to say that the operations were very different in the
early years.

I think the radium sources may be the ones that call things into question in terms of where they were used, how they were used, and what the controls were.

And I think the radium sources, as I recall, you're still characterizing those in terms of source output and distance, right?

MR. ALLEN: Yes.

CHAIRMAN ZIEMER: I think in principle, it seems like you can do that but there's some questions that have to do with practice that come into play.

I think SC&A has raised those issues and to some extent, pointed out analogies with other facilities in years where we are not able to pinpoint controls. We don't have monitoring data. We don't have information on, apparently on the extent to which the workers and others were controlled in terms of their exposures.

I guess that was the nature, John.
You can help me out there.

    DR. MAURO: The way I've been looking at this is that the betatron models and concerns -- workers who were involved in working the betatron is a tractable problem.

    We have lots of differences of opinion on the best way to do it and what the assumption should be on distances and times and on the activation products in the neutron unit.

    All of this is, in my mind, tractable. What in my mind right now is some question as to whether it's tractable, is reconstructing doses to workers who were involved in using radium sources, especially in the 1950s without having any film badge data.

    That becomes a problem, a class of problem, that I find difficult but as being tractable and it comes down to that.

    CHAIRMAN ZIEMER: So in part, we need to take a look at what is being proposed
on the radium sources. I mean, it's in the paper there and we can take a look at it.

DR. ANIGSTEIN: I'd like to state a minority opinion even on the betatron. I think that the doses to the betatron operators are pretty much -- are tractable because first of all there's models and we have detailed information from -- there was like four former betatron operators who got together and compared notes and sent us e-mails and faxes. Besides, they were badged.

We can quibble about the badges -- how they accurate they were, but they were badged.

Workers who were not betatron workers were in the unshielded parts of Building 10, I think -- I don't know how to deal with because, as I pointed out, somebody in the restroom getting 53 -- I forget what it was -- 30 mR per hour.

I don't know workers at another point, the chainmen who handled the uranium --
and they were not assigned any skin dose because they were not in this category of betatron plus two hours.

So whether it can be done is one -- we can never say something can't be done until someone has tried to do it. But so far, it has not been done in a manner that would meet the test of our all workers, all the non-betatron operators, being treated properly and fairly even during the film badge period because they weren't given film badges.

We had something like 3,000 employees in GSI and between 17 and 60 on any given week had film badges.

CHAIRMAN ZIEMER: Nonetheless, in spite of that, in my mind, betatrons are still easier to deal with partially because they're fixed in location. We know something about their outputs and you can -- even if -- you can make reasonable assumptions about occupancy. So in principle, it's much easier than a case where you have radiant sources
which can be used in any number of different places. We don't know how they were -- but again --

DR. ANIGSTEIN: Including somebody's spot.

CHAIRMAN ZIEMER: I think what we'll have to deal with is how NIOSH proposes to reconstruct dose in those cases and whether or not that -- in the minds of the Board is --

MR. DUTKO: Dr. Ziemer?

CHAIRMAN ZIEMER: Yes.

MR. DUTKO: This is John Dutko, betatron magnaflux operator.

CHAIRMAN ZIEMER: Yes, John.

CHAIRMAN ZIEMER: Dr. Ziemer, I know it is very true that we were badged, but a good portion of that time when we worked in 9 and 10 building in magnaflux over time, we did not wear those badges the same as the people out there. The only time we wore the badges, once more, was when we were working in the betatron, sir.

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I look at it from a different perspective. When you people do dose reconstruction, you look at a piece of paper. I look at my fellow workers here on this end with cancer, sir. That's what tells the story on my end. Thank you.

CHAIRMAN ZIEMER: Yes. Thank you for that comment. I think we're aware of that -- your statements before about the betatron workers only wearing their badges in the betatron, which incidentally, I noticed in the documents that we got -- some of the management radiation safety documents -- you can go back and check the ones, recently recovered documents, have statements in them saying that betatron operators are required to wear their badges all the time, including the times they are outside of the betatron.

That's very much in conflict -- the official statements in the GSI safety manuals are very explicit about the betatron operators wearing their badges at all times.
during work hours regardless of whether or not
they're in the betatron room. You can go back
and check that.

So I know that that may have not
been the practice.

MR. DUTKO: It was company policy
not to wear them, sir.

CHAIRMAN ZIEMER: I'm telling you
it was company policy in writing to wear them
is what I'm telling you. They may not have
enforced it, but it's in writing in the
documents that were just provided to us.

MR. DUTKO: I might be wrong, but I
guess --

CHAIRMAN ZIEMER: You probably are
correct that it wasn't done, but I was
surprised to read it in the documents.

I'll go back and double-check.
I read it, I think, several times. I said,
wait a minute. This -- I know that I've heard
this statement that nobody wore them outside
the betatron room. Why did the safety manuals
say this?

    MR. DUTKO: We were told not to wear them on the floors because of burning, hot sparks, grinding, welding -- anything that could damage it.

    CHAIRMAN ZIEMER: I don't doubt that that was the practice. My only point was that it appears that the practice was different from the official written policy.

    But that's -- you know, that doesn't change the fact that you didn't wear them all the time.

    Okay. Let's go on quickly here. Item -- where are we at? Item 6 -- Item 5 -- no direct neutron monitoring data.

    My initial comment is that the absence of neutron monitoring data doesn't prevent reconstruction of neutron doses since you can calculate neutron production rates very readily from the operating parameters of the cyclotrons and from the composition of the target materials. In my mind, the neutron
doses are relatively easy to handle.

Bob, do you have a different view of that?

DR. ANIGSTEIN: No. I mean, I don't agree with the proposed method that was at an early Work Group meeting that was proposed by Dave Allen of taking the neutron/proton ratio and then changing the proton dose to recalculate the ratio and the neutron dose through it.

But yes, we did do an analysis of the neutron dose and it's usually -- when the proton doses were high, the neutron doses were a relatively small fraction.

CHAIRMAN ZIEMER: Well, my experience with high-energy accelerators is that the neutron doses to workers are typically very small. Typically, where you get the most neutrons is right at the target and that's where you get the activation so you get activation products, which gives some residual dose to workers after the thing is
shut off.

But in any event, I think you can calculate neutron doses pretty readily.

DR. ANIGSTEIN: I agree.

CHAIRMAN ZIEMER: So whether or not you monitored for the neutrons per se is not as critical. But that's just a comment.

MEMBER GRIFFON: I'm just going to ask the same question as the last one. What's the current approach? Are you still using neutron/proton ratios?

MR. ALLEN: That was the proposal that Bob just said he disagrees with, but the Appendix doesn't include that.

CHAIRMAN ZIEMER: But I guess you'll need to address that in some way when you go through the new materials, taking into consideration the comments plus the new source term. Certainly in my mind, you can do neutrons pretty easily.

MEMBER GRIFFON: I guess the only question -- I mean, I can see how you would
approach it, but I think you're going to go with probably bounding scenarios or whatever where you look at different combinations of the source terms and you know.

CHAIRMAN ZIEMER: Yes. You might take the -- I mean, it goes up with the energies.

MEMBER GRIFFON: Right.

CHAIRMAN ZIEMER: The photon energy. There's a neutron cross-section and then also it's going to vary with target material.

MEMBER GRIFFON: Is that the way you're leaning is toward modeling something like that rather than neutron/proton ratios off the --

MR. ALLEN: Yes. I mean, neutron production -- I mean, the only evidence of it is the physics associated with it. The physics are well known and can be modeled.

MEMBER GRIFFON: And you have this -- I know we've talked about source term a
little bit here, but you're pretty confident that you can run the gamut of the source terms that they would have used, right? Not when they're scanning upper targets.

MR. ALLEN: Yes. I believe so if I'm understanding your question. Yes.

MEMBER GRIFFON: I mean, there was uranium in this and there was some steel?

MR. ALLEN: Right. Yes.

MEMBER GRIFFON: We know enough about the end material.

MR. ALLEN: Yes.

CHAIRMAN ZIEMER: Comment 6 was --

DR. ANIGSTEIN: I just brought up to the Board the neutrons.

CHAIRMAN ZIEMER: Okay. Bob has a slide here on the neutron production, but I don't think it's important that we know the numbers right now; just the fact that -- now, what you have there, Bob, is that calculated based on outputs or what is that you're showing us?
DR. ANIGSTEIN: That's based on the maximum output of the betatron depending on whether we were shooting -- this is based on the report.

This is depending on whether we were shooting with the casting of the railroad track or in the center of the shooting room.

CHAIRMAN ZIEMER: But your neutron values are based on what?

DR. ANIGSTEIN: I calculated using MCNP and using -- basing on first principles.

CHAIRMAN ZIEMER: Right.

DR. ANIGSTEIN: We modeled the --

CHAIRMAN ZIEMER: Right. That's sort of, in general what I had in mind.

The one thing you always notice on this, for example, if I take your first set of -- I'll just tell Dr. McKeel and Mr. Ramspott that we're looking at a chart that came out of one of the SC&A reports.

DR. ANIGSTEIN: Page 14.

CHAIRMAN ZIEMER: It's the April
21, 2008 report.

The photon doses are, in general, about an order of magnitude bigger than the neutron. But the neutron is not -- you know, you don't ignore. It may increase the total dose by 10 percent. These are expressed in millirems, so you take into consideration the quality factor for the neutrons.

DR. ANIGSTEIN: Yes. Oh, yes.

CHAIRMAN ZIEMER: So that's sort of the issue that -- you don't need necessarily film badges to know the neutron output because you can reconstruct it from first principles.

DR. ANIGSTEIN: Correct.

MEMBER GRIFFON: And then I guess the difficulty in this kind of model comes into placing the workers in the area or wherever -- operators versus -- it's interesting that roof reading --

DR. ANIGSTEIN: Yes, because that was the one place where, according to -- it's very interesting. According to some of the
information written for the AEC license applications for the room 6 using the small cobalt sources -- a quarter millicurie, a quarter curie cobalt sources, no one was to be -- no one was to go on the roof. No one could even go into the overhead frame without permission from the Radiation Safety Officer, who was also the supervisor, you know, familiar with his name, also the supervisor there.

However, nothing was said about the betatron building. According to one worker who attended this briefing session in Collinsville in the fall of 2007, he said he went up and serviced the fans on the roof of the betatron building.

I said, did you communicate with the operator and tell him you were going to be up there like, don't shoot, I'm here. He says no. There was no communication.

He didn't go through the building to get to the roof. He went from up, from the
next building.

MEMBER GRIFFON: Right.

CHAIRMAN ZIEMER: Okay, comment number 7, NIOSH has not characterized all radiation source terms as mandated.

Of course, now we need to determine if this is still the case after the most recent NIOSH White Paper that they have provided us with. Is that still the case? That's sort of an open question yet, as we understand. It certainly was true before that. Is it still true?

Then a series of comments; NIOSH has made no report on NRC 2010-0012 sealed source licenses that GSI has obtained and so on.

Well, of course, as we've already indicated, they have now produced the White Paper that evaluates those referenced materials and they provided a dose-reconstruction approach.

As far as -- there's comments
here. Let's see. I guess Dr. McKeel had said that he believes that SC&A should review this material and talked about the Board and Work Group have not tasked SC&A to do so and was asking that we ask SC&A to review the NRC material.

My comment on that is that in my mind, that's NIOSH's job to review the documents and then to give their position on those and make the evaluation.

Now, it certainly -- and then if we task SC&A to review the NIOSH positions, obviously, they may need to return to those documents.

But my view on it was -- of course, if we had a different view, we could do that tasking today, but my view is that in tasking, to review those documents is not an SC&A job. That's a federal job. That's their job to say, here's this information. Here's what it means to us. Here's how we will use it.
Once we know that -- what they plan to do with it -- then we can say, all right, is that the right plan?

So that's kind of my view on that. So we don't, in my mind -- of course, as John knows, this has sort of been an ongoing theme for me. I keep saying let's not task SC&A to do NIOSH's jobs.

So of course, the Work Group members -- we, ourselves -- I think the point that this was -- Dr. McKeel made a statement that we had had the materials very long ourselves, but obviously, we are free to evaluate those and should on our own become familiar with the contents and so on and then as we proceed forward, we may have additional tasking.

But that was sort of my reaction on that. I don't know how the others of you -- do you have a differing view? Feel free to make that known.

I want to make sure that we're on
the same page. Dr. McKeel do you understand my
sort of position on that?

DR. MCKEEL: Dr. Ziemer, this is
Dan McKeel.

CHAIRMAN ZIEMER: Yes?

DR. MCKEEL: Yes, I do understand
your position on that. I do have a comment on
that item number 7C about the 80-curie cobalt-
60 source.

CHAIRMAN ZIEMER: Yes, go ahead.

DR. MCKEEL: Okay. Actually, the
1969 80-curie cobalt-60 source was at GSI.
That was documented in those NRC papers that
you now have.

Now, that 1968 date is what I want
to stress to you is a different date
concerning first arrival of the big source
than a number of the GSI workers have provided
sworn affidavits about this matter.

What they have said collectively -
- there was a cobalt-60 GSI-owned 80-curie
source in use at GSI in the 1963, 4, and 5
What is fairly convincing about that to me, very convincing, is that people like Mr. Dutko, who is on the line today, assisted with that large cobalt-60 source, which really physically couldn't be confused with the small sources that were used in Building 6.

That large source was used in the new and the old betatron building. In fact, proof that it was is the fact that in both the old and new betatron building, there were ports were made in the control room wall. We've sent in pictures of one of those in the old betatron building of shielded ports through which the cable ran that retracted the pig -- I mean the source from the pig -- out in the betatron facility.

The men have further testified that those cobalt-60 gamma sources -- the big one, the 80-curie one, was used for Westinghouse channel heads, which were up to
20 inches thick in parts and featured a dome structure that really only a cobalt-60 type source could accommodate that sort of radiography. Films could be placed on the inside. Imaging such a large casting required multiple shots.

Anyway, they were Westinghouse nuclear power plant channel heads and missile launch tubes for submarines, nuclear submarines that were also imaged with gamma sources that could not -- could not have been imaged with the small cobalt-60 sources.

Also, Mr. Ramspott pointed out that in David Allen's report -- the recent White Paper on sources, on page 5, he mentions the 70-minute exposure on thick steel. Well, the little sources really couldn't image through thick steel -- how thick it was.

But anyway, as it's clear that the license says that there was a 1968 cobalt-60 source and the license renewal implies that that's when it first came to GSI. But we
certainly have countervailing testimony from
more than one worker who says they used the
big Co-60 source there.

So I think that this is another
example where the proof, quote, is worker
testimony and you know, that's probably -- I
mean, unless -- again, unless somebody else
can turn up with relevant records like
registration records from the State of
Illinois, that's where things may lie. The
decision will be, do you accept the workers'
statements or if you do reject the statements
of eyewitnesses who say they assisted with a
cobalt-60 source, then you would have to
conclude that they really were grossly
ignorant of the situation.

At the very least, they were -- I
don't know how you would resolve that. But
here are good people who have no reason to
misrepresent things. They say the big source
was used in 1963,4,5. I need to put that on
the record.
CHAIRMAN ZIEMER: I'm glad you emphasized that point. Dan, do you recall -- I read these license applications but there were several of them and I don't recall now. Do you recall if the 63 application itself mentioned the cobalt, the 80-curie source?

DR. MCKEEL: No, sir. I read them front to back and a mention of a large cobalt-60 80-curie source does not appear until the 1968 renewal.

As much as I would love to say that it implies that the source was there and just added to the license, it really reads to me as though the large source was added in 1968.

So I would say it's an unresolved dilemma: worker testimony versus license application. I don't know what to do with that.

My suggestion was, in other documents that I've submitted, is some light may be shed on the fact by looking at the
records from the GSI Eddystone, Pennsylvania plant, which as you all know, closed in 1963 and one of the betatrons, for instance, was brought to General Steel and put in the new betatron building.

There is some suggestion, speculation among the workers that perhaps a cobalt-60 large source was brought from Eddystone to Granite City.

But again, and I think Dr. Ziemer would agree with me that that should have been licensed, there should be transfer papers and as soon as that source got to Illinois, it should have been registered immediately with the NRC and/or IEMA or both. We don't have any of that data. We don't have any of that documentation, so that's all I know about that.

CHAIRMAN ZIEMER: Okay, I appreciate those comments. So the suggestion is that there's a possibility this was at another site. Where was that? Pennsylvania?
DR. MCKEEL: Eddystone actually did very similar work.

CHAIRMAN ZIEMER: But they were located?

DR. MCKEEL: In Pennsylvania.

CHAIRMAN ZIEMER: Pennsylvania. When that betatron was moved to Illinois, that possibly the source also might have --

DR. MCKEEL: That's one of the ideas, right.

CHAIRMAN ZIEMER: Yes. Of course, then there would have had to have been a license in Pennsylvania for that.

DR. MCKEEL: But that's never been asked about and I will admit that's one of the to-do tasks that I've not gotten around to.

CHAIRMAN ZIEMER: Because on the licensed sources is a twofold thing. Those that have worked in this field over the years, you know that not only did the recipient have to have a license, but the provider, whether it was a commercial firm or another
institution, had to have evidence that there was a license for the person or the entity receiving the source. So if the thing was at another facility and transferred without that being done, you have kind of a double violation.

   DR. MCKEEL: I agree.

   CHAIRMAN ZIEMER: Yes.

   DR. ANIGSTEIN: Just to clarify, the Eddystone facility belonged to General Steel Industries.

   CHAIRMAN ZIEMER: But it could have had a separate license.

   MEMBER POSTON: Doesn't make any difference.

   CHAIRMAN ZIEMER: It probably would have had a separate license in a separate location.

   DR. ANIGSTEIN: If the license is here it should be for Granite City.

   CHAIRMAN ZIEMER: Yes. But I can envision -- because it's happened to me where
a source gets transferred to a site and gets used and then suddenly somebody realizes, wait a minute, we're not covered by this in our license. We've got to get our license updated.

Yes, so those violations do occur. It's quite possible.

DR. MCKEEL: I mean, Mr. Norris, who was a supervisor at GSI and started the film badge program and so forth and so on, you know, he also came there from Eddystone and knew all about that.

So it is possible. I mean, it's possible.

CHAIRMAN ZIEMER: Okay. Dave has a comment.

MR. ALLEN: The 1968 application for renewal of the license -- part of that application describes the process which they were using.

They used the same general write-up year after year, but in that year, they added in a paragraph about the 80-curie
source.

It said in addition, due to workload and large industrial casting, General Steel Industry has decided to obtain one 80-curie cobalt-60 source from Radionics Incorporated.

It goes on, but it certainly implies there that they intended to purchase this from Radionics and there is later a disposal of three sources. I believe it was the Radionics and that would include our number, right?

CHAIRMAN ZIEMER: Is there any evidence -- do we have any Radionics records showing that they provided such a source?

MR. ALLEN: Not that I'm aware of.

DR. MCKEEL: This is Dan McKeel again. I have not -- I don't have any documents to prove that. Oh, I'm sorry -- except the license itself.

CHAIRMAN ZIEMER: Right. Well, you know, and again, this is an open issue here,
but one of the things that we'll have to resolve, I think, is NIOSH will have to take into consideration the worker testimony that there was an 80-curie source, whether or not it's licensed immaterial.

If it were there -- if we reliably thought it was there for some reason, can you still characterize it in principle? I guess you can.

DR. MCKEEL: Well, like I say, the ports that are described in the license document were present there during the early 1960s when people like Mr. Dutko were there. He left by 1966, so he was -- if they weren't put in until a big source were put in in 1968, Mr. Dutko would have no way of seeing that.

And those ports -- we couldn't get into the new betatron building, but we did extensively tour the old building and took pictures of the ports.

And the diagrams in the license actually show floor diagrams of the betatron.
facilities and they both show and state that the cobalt-60 sources were not -- big ones, I'm talking about -- big one -- not to be moved out of those buildings. In fact, there is a letter in that material -- quite interesting -- where apparently GSI applied to use the large 80-curie source outside and the Illinois Department of Public Health, which later turned over its records to IEMA, denied that request.

Actually, the AEC went along with them. So even though we know that some 80-curie source was used outside and the gentleman that Dr. Ziemer is going to speak about his interview, actually told us -- I think put on the record -- that he had to stop an outdoor 80-curie cobalt-60 source shot.

You know, so there's a lot of corroboration that there was a large source there at one point. The fact that the men say that they knew about those ports and saw those ports had to mean that they were put in there
well before 1968.

You know, there is at least a little bit of physical evidence as well. There are no pictures that I'm aware of of the GSI large cobalt source unfortunately, but there's a lot of testimony about it.

CHAIRMAN ZIEMER: Okay. Well, thanks for that additional information. Comment here or a question?

MEMBER POSTON: I was just going to say that the only difference between the 80-curie source and the small source is time. They have the same photon. They don't penetrate -- the quality of your radiograph is --

CHAIRMAN ZIEMER: Right. You could make a radiograph with a small source because the penetration is exactly the same. It's just getting enough photons to get a picture, so a small source would take much, much longer. Those were less than a curie. They were maybe half a millicurie, so you're talking about 160
times longer.

MEMBER POSTON: Sure.

CHAIRMAN ZIEMER: So it's not practical for probably --

MEMBER POSTON: He's implying that you could only do it with a big source. You can do it with any size source.

CHAIRMAN ZIEMER: It's not a penetration issue. It's a time issue, yes.

MR. RAMSPOTT: Dr. Ziemer, this is John Ramspott, if I may?

CHAIRMAN ZIEMER: Yes, John?

MR. RAMSPOTT: The type of casting alone -- the channel head, the steam chest, the Polaris submarine missile launch tubes -- they required a larger source.

CHAIRMAN ZIEMER: John, all Dr. Poston is saying is that a smaller cobalt --

MR. RAMSPOTT: I agree with Dr. Poston. He's making a very good point.

CHAIRMAN ZIEMER: A small cobalt-60 source and a large cobalt-60 source both have
identical penetration.

MR. RAMSPOTT: I fully understand that.

CHAIRMAN ZIEMER: The only difference is it takes longer with a small source than a large to get enough protons through.

MR. RAMSPOTT: I understand. He made a very valid point. I understand that. There would be no reason to try and do that job with a quarter curie. It would take -- what did you say? 160 times longer?

CHAIRMAN ZIEMER: Whatever it was, yes.

MR. RAMSPOTT: I mean, that's -- and those type of castings are what they had. We have pictures of it and they're dated. Those are the kind of castings they had at Eddystone, Pennsylvania.

It's coincidental, at least in my mind, that there's an application for an 80-curie source in 68. They closed the plant down
in Eddystone in 63. The cobalt-60, if I understand it, has a half-life of 5.7 years. It's about a five-year spread that all of a sudden, they now need a new cobalt source, an 80-curie source.

If I were a betting man, I would bet that came down from Eddystone, no ifs, ands, or buts. The betatron, and until we made people aware of it, most didn't even know there was a second betatron at GSI. So just because there's no paperwork on it doesn't mean it wasn't there.

CHAIRMAN ZIEMER: We understand. We're going to take a comfort break in a moment.

I just very quickly wanted to point out that on number 8, that had to do with the Picker X-ray film business. We've already talked about that.

On number 9, it talks about the need to update Appendix BB. We're actually, of course, going to do that. We have the recent
source-term information and we have the documentation that's been gathered.

I just wanted to add that we need some -- it would be helpful to know what time table NIOSH might be on to update the Appendix BB information. I don't know how fast that will come about. I mean, I don't necessarily want you to have to commit to anything, but we need to have some idea of planning ahead when we're going to be able to meet again and so on.

MR. ALLEN: Well, you've already asked me to update the responses.

CHAIRMAN ZIEMER: Which is basically what we need.

MR. ALLEN: We could essentially put a plan together and a time line, update those responses, and send along what our path forward is essentially at that same time.

CHAIRMAN ZIEMER: For Appendix BB?

MR. ALLEN: Yes. I couldn't commit to a reasonable date at this point right now,
but I can sort it all out.

    CHAIRMAN ZIEMER: Well, the first thing was to address the issues that we have and then that will also kind of do -- lay out what is needed to revise Appendix BB in any event.

    DR. MCKEEL: Dr. Ziemer, this is Dan McKeel. May I make one short comment?

    CHAIRMAN ZIEMER: Of course.

    DR. MCKEEL: That short comment is that I noticed in the White Paper that Dave Allen did about the sources that he uses the number in there for the hours worked as 3250.

    What's very interesting about that number is when you break it down, that's the 65-hour work week that was agreed on in Dr. Anigstein's meeting with the workers in October of 07 in Collinsville.

    So now it's gratifying to see that not only is that a number that SC&A accepts but also NIOSH accepts it.

    The problem that the petitioners,
advocates and experts and workers and claimants from GSI have is that we have no information, no evidence that that number has been plugged into all the dose reconstructions. More than 90 percent at GSI have been accomplished under Appendix BB.

So you made the comment earlier that as part of the normal process, if a parameter such as average work hours a week worked changed, that NIOSH would automatically update their technical document. Well, Appendix BB says the average work week at GSI is 46 hours.

It was agreed -- now, almost three, two and a half years ago -- that the average work week consensus of all the workers there was 65 hours. NIOSH appears to accept that, yet that information, which as -- I think Dr. Anigstein pointed out years ago -- that that alone is a 35 percent increase in exposure if you just take that simple formula of dose rate times time equals exposure.
So there's an instance where over that -- since 2007 June when Appendix BB was reached, I literally -- I'm sure you have too -- seen dozens and dozens of revised and updated NIOSH technical documents being posted on the OCAS website except for Appendix BB.

We simply cannot understand that. So I really just cannot let that just go by unanswered. Again, as much as I appreciate the intention to revise Appendix BB, here we are in May -- next month it will be three full years -- and we still don't have any time commitment at all about when Appendix BB will be updated.

You know, by now, the amount of new information is voluminous. So I just must emphasize how -- of all the things that I might be able to say today, that's the most important one of all. We need to have Appendix BB updated as soon as possible. I think I'll let it rest with that.

CHAIRMAN ZIEMER: Dave, did you
want to comment on that? That's not been plugged in to the official -- well --

MR. ALLEN: Dose reconstructions are being done by the original Appendix BB right now.

CHAIRMAN ZIEMER: That's not an officially accepted position, yet you used it in your document, which is a White Paper at this point.


CHAIRMAN ZIEMER: It's not an official part -- it has not been incorporated yet into the process.

MR. ALLEN: Right.

CHAIRMAN ZIEMER: It's like the first step, which you are indicating, though, the intent to use that. Is that correct?

MR. ALLEN: Yes. Definitely, that's a point in the estimate. We still have film badge data that has to be reconciled with whatever scenarios we come up with. We can't come up with an estimate that would show up on
film badges if the film badges aren't showing that.

One of those film badges is the control room area badge that we have to be able to reconcile that. We can't come up with a model that gives us a millirem an hour for 160 hours and a film badge which is less than 10.

There's quite a few things to reconcile and they all -- the more you lean one direction, takes away from another direction so they all kind of balance out to where you get a clearer picture of what's bounding for reconciling all the information.

I hope that answers your question.

CHAIRMAN ZIEMER: Well, I think Dr. McKeel was asking whether it's an official part of GSI dose reconstruction at this point. I think the answer is it is not an official position at this point.

MR. ALLEN: Right.

CHAIRMAN ZIEMER: But we here your
point, Dr. McKeel.

We're going to take a comfort break here for 15 minutes and then we'll reassemble.

(Whereupon, the above-entitled matter went off the record at 2:49 p.m. and resumed at 3:04 p.m.)

MR. KATZ: We're just reconvening after a short break.

CHAIRMAN ZIEMER: Okay, thank you very much. Let's continue with the concerns that Dr. McKeel had raised.

Item 10 -- McKeel SEC 105 Findings on Appendix BB and NIOSH SEC 105 Evaluation Report. Pages 1016 of the NRC FOIA materials and several White Papers have not been adequately considered in dispute resolution on the same documents.

Only NIOSH and SC&A findings have been duly considered by the Board. The co-petitioner is concerned the scientific value deserves to be addressed and that their own
comprehensive manner by TBD-6000 Work Group or an investigative group should be tasked to expedite this effort.

My only comment there is that I believe the Work Group does desire to address the petitioner's concerns. In fact, that's partially what we're doing here. Any that remain inadequately investigated; we'll certainly want to know about that.

I just want to commit to Dr. McKeel that we do intend, indeed, to address his concerns to the extent we're able with the help of both NIOSH and SC&A.

I think the Work Group would agree that we, indeed, do want to do that. So I'll just pass that along to you, Dr. McKeel and to the others at GSI.

Number 11, Dr. McKeel indicated that a presentation he made to the Board in February had not been posted in the public docket as requested.

Ted, you might speak to this. I
did note that, of course, this presentation to
the Board was in the public record in the form
of the transcript. I'm not sure about a
separate posting of it, that practice. If it's
already in the transcript, do we also post it
separately or what's the status?

MR. KATZ: I'm not really clear
about which we're talking about here.

CHAIRMAN ZIEMER: It was a
presentation made to the Board. I believe --
and Dan, you can help me out -- I think it was
provided to us maybe in writing and you gave
the presentation by phone as I recall. You
maybe had a request that that be put on the
website. I don't recall. It is in the
transcript. I know that.

DR. MCKEEL: I had requested --
there were some tables and things that I
requested that they be put as -- you know,
posted on the website under the public docket.

I can resubmit that. That's not a
problem. I mean, it's not a problem that we
can't address easily by resubmitting it.

CHAIRMAN ZIEMER: I know it wasn't
as a separate document. There was a recent
document. In fact, it might be this one that
was posted.

DR. MCKEEL: Yes.

CHAIRMAN ZIEMER: But the
presentation that you referred to, indeed, was
not a separate document but it is in the
transcript. Of course, the figures are not
there.

DR. MCKEEL: Ted Katz helped me
with that and, you know, suggested a procedure
by which even Board presentations about SEC
Evaluation Reports -- that's really what the
issue was.

Even ones that have tables, if
they're submitted as a PDF file, can be posted
and so I appreciate his efforts and that's
what I'm going to do.

CHAIRMAN ZIEMER: Okay. Number 12,
and I won't read the whole item, but it has to
do with redaction and specific concerns that both Dr. McKeel and Mr. Ramspott's names were redacted from the Worker Outreach transcript.

I think that is more addressed to Mike Gibson, but since it's in this document here, I did want to make a remark on it.

First of all, to say that our Work Group is not involved in the redaction policy. But I think you understand the concerns, but I believe they have to be directly addressed by the Agency, number one.

I will express my personal view. I don't personally quite understand why Dr. McKeel's name has to be redacted, but nonetheless, it's an issue that the Agency has to deal with.

MR. KATZ: I have addressed it. Dr. Ziemer, I've actually responded to Dan and John on this issue.

The Board policy, in terms of redaction of third parties, is very clear. This is why it was redacted by the person who
does the redactions.

   After re-inserting a third party's name when they've been redacted, according to the Board policy that I state at every Board meeting -- I mean, the issue there boils down to just resources to set up a system to un-redact these, I have to balance a lot of other pulls on resources with respect to OGC and other parties that would be involved to do that.

   At this point, I have a lot on their plates and to charge them with creating a waiver form and other -- and then getting people to take care of redactions when they're requested which is a very unusual circumstance to have a third party want their name un-redacted -- it's just something I can't deal with right now in terms of resources.

   I've responded to them in writing to both John and Dan. I'll keep this in mind for down the road, but right now, it's just not as high-priority as some of the other
matters.

CHAIRMAN ZIEMER: I understand. I just wanted to make sure that we were addressing it.

Number 13 has to do with asking the Department of Labor to invoke their subpoena power to gain certain records. Again, I won't go through this in detail, but I did want to comment on -- my own personal comment on that matter.

Clearly, additional monitoring records are of value. There's no question about that if there's records out there.

My take on it is that the issue may be whether or not such additional records actually do exist and if so, where they are located and is the use of a subpoena necessary to solve the problem.

It seems to me if it's clear that an agency or an organization actually has certain records and they are refusing to turn them over, that certainly would be a
compelling place to call for a subpoena. I
don't think it's that clear in this situation.

I'm sort of asking, is it -- Dr. McKeel, I'm basically asking, is it your
contention that a good-faith effort to find
the records will only occur if a subpoena is
issued?

I'm trying to get a feel for
whether or not the subpoena will make any
difference if the agencies involved don't know
where to look or don't know what records are --
what do we gain from the subpoena?

DR. MCKEEL: Dr. Ziemer, this is
Dan McKeel. Thank you.

It really is my opinion that at
the present moment, there are relevant records
for GSI in the form of radiation registration
records for different sources that we're
trying to characterize and are incompletely
characterized that reside at Illinois
Emergency Management within the Nuclear Safety
Division.
As I tried to point out, my recent two FOIAs, which landed at IEMA, produced some records, which tells me that if they had some of the records, they're bound to have had many, many more. So the records that we got on their face are very incomplete.

Now, it is possible that somebody at the Department of Labor could stop just short of a subpoena and make an effort to contact that agency at the highest level, say, by phone, and see if we could elicit some more cooperation.

But I'm still saying that in the long run, I believe that the legal group at IEMA who replied to my FOIA request might listen to a subpoena when they won't listen to other things.

I have talked to those folks and do understand that agencies are restricted as far as their personnel that they can devote to things. On the other hand, releasing FOIA requests that the Agency has really isn't an
optional thing. They have to release them.

Now, can I prove that they have those records? Well, of course I can't. That's a burden that you could not prove.

But you know, as it turns out, I was right about the license information because -- the reason I was right was because it had to exist.

Now, you know, it took two tries by me and tries by NIOSH and SC&A to get that information and so forth, but the records did emerge eventually.

If you remember, it took multiple tries over several years, including by a senator's aide to eventually get the Department of Energy to release the records that made the Dow Madison Site an AWE site.

So I've always contended that where that whole effort stopped short was we should have subpoenaed the Dow Midland Headquarters office who had even more records related to Dow Madison and the thorium
shipments that were said to take place by many workers to Rocky Flats.

So it's a judgment call, but the way I would say it is, that is a tool that was written into EEOICPA by the founders who enacted the legislation and it has been used almost never.

When I've asked about it, which has been repeatedly, the answer has always come back from both NIOSH and Department of Labor that we don't use it because we are sure that or we believe that everybody is acting in good faith.

Well, I'd like to make that assumption, but having gotten responsive documents in some cases two years later after multiple tries, I guess it's a difference of opinion on what constitutes good faith. I do believe that the subpoena would make people look harder.

That's all I can say about it.

We're missing some vital records that have to
do with General Steel. My efforts -- I believe they reside at IEMA and I think a discussion about subpoenaing those records might be helpful.

CHAIRMAN ZIEMER: Thank you. Let me ask a question. Maybe I'll ask -- I'll address it to Ted.

Let's suppose there are such records there at the Illinois agency that were needed for dose reconstruction. We don't need to go through Labor anyway, do we, to get those, Ted?

MR. KATZ: Not to request them. But when it comes to the subpoena power, I don't know. I think that rests with the Department of Labor. Is that correct?

CHAIRMAN ZIEMER: Well, when Dr. McKeel said, perhaps the Department of Labor could stop short of the subpoena but request the records, that an agency requesting the records might have more clout, as it were, than an individual FOIA request.
Wouldn't the same be true or have we already done this? Has NIOSH requested the records?

MR. ALLEN: Yes, we have.

CHAIRMAN ZIEMER: You have and you have not gotten anything more?

MR. ALLEN: We requested everything with GSI. In response, I think we got some licensing Department of Labor letter from not necessarily this particular plant, but the one --

CHAIRMAN ZIEMER: The other -- Granite City?

MR. ALLEN: It did -- at least one of them covered this plant also. But it was after this time frame. It was more modern -- in the 90s, if I remember right.

DR. MCKEEL: This is Dan McKeel. Let me comment.

NIOSH did, in fact, ask for the licenses and Laurie Breyer sent me a nice list of what they had gotten back. I'm talking
about GSI source-term licenses now.

But what they got back was all after 1975 so there was no material from before 1975.

So again, in a few situations, I got to see the letters that NIOSH wrote. In one instance, for instance, it was a group letter asking for anything you might have about so and so.

So it's also in how you go about asking for specific information. For instance on these registration records -- I can send you what they sent me. I think if you approach them by saying we know you have some of the records -- Illinois Department of Public Health said that they turned over their set of records to you so we respectfully ask you to look harder, I think that would be useful.

Now, if that would -- I don't know whether that would produce them or not. I can't guarantee that the records actually still exist, but what I do expect -- and should be accomplishable -- is I know that
agencies have records-retention policies and that records are routinely lawfully disposed of and must be. That's fine. But there are also records of when those records are destroyed.

There should be an entry in their files. GSI records, 19-whatever. Radiation exposure records, 1975 through whatever the years are were destroyed on so and so, 1990.

So I think the agencies can and should come up with that kind of information. If they did, that would be evidence, as far as I'm concerned, of acting in perfect good faith. So that's all I can say.

MR. KATZ: Jim, I don't know -- are you -- given that Dan has extracted some information from them, that opens the question, are you willing to take another run with another letter and see if you can --

DR. NETON: I have a note here from a previous discussion this morning about that and I'll bring it back with our record people.
It certainly is not an inordinate effort to write a letter.

MR. KATZ: Right.

CHAIRMAN ZIEMER: Do you have a record of the items that Dan has already recovered from them for those earlier years?

DR. NETON: I believe he was going to provide them to us. I think there were only three sources or pieces of information or something that he had recovered.

CHAIRMAN ZIEMER: Dan, the information that you already recovered from the Illinois Department --

DR. MCKEEL: I'm happy to send them. I'll send them to Dave Allen. Is that who I should send them to?

MR. ALLEN: That would be fine.

CHAIRMAN ZIEMER: Or Jim.

DR. MCKEEL: Okay, I'll send them to both.

DR. NETON: Please.

DR. MCKEEL: I'll just digitize
them and send them right away.

CHAIRMAN ZIEMER: They'll make another run at it and see whether or not it's fruitful at all.

DR. MCKEEL: Okay. I'll send you my correspondence so you'll have the whole package.

DR. NETON: That would be great.

MR. ALLEN: Thank you, Dan.

DR. MCKEEL: All right, thank you.

CHAIRMAN ZIEMER: I think that takes us through this document. I do know that the end, Dan, that you asked that this document be posted in the public document file --

DR. MCKEEL: It has been.

CHAIRMAN ZIEMER: -- and it has been. I just wanted to confirm that that has been done so it is there.

Okay. I would like us to move now to the petition matrix. This is Petition 00105, Issue Resolution Matrix. I'm looking
for the date. The last version I have includes SC&A replies dated the 12th of this month so this is very current.

DR. ANIGSTEIN: No.

CHAIRMAN ZIEMER: No? That date must have gone in automatically when I -- I was saying, boy -- I didn't -- is this from today? We're really on top of this.

DR. ANIGSTEIN: John sent that to you. Did you send that to him?

DR. MAURO: The GSI matrix? No.

DR. ANIGSTEIN: Yes, I think you did.

DR. MAURO: I sent the TBD-6000.

DR. ANIGSTEIN: Oh, I'm sorry. The GSI matrix -- did you just open it, open a Word file?

CHAIRMAN ZIEMER: I opened Issue Resolution Matrix.

DR. ANIGSTEIN: Okay, it updates itself.

CHAIRMAN ZIEMER: It must have
updated the date itself.

    DR. ANIGSTEIN: Yes, it does.

    CHAIRMAN ZIEMER: That's what fooled me here. But I was looking for your original data on that.

    DR. ANIGSTEIN: It's 10/12.

    MEMBER MUNN: October of last year is the date.

    DR. ANIGSTEIN: Yes. 10/12/2009.

    MEMBER MUNN: Yes.

    CHAIRMAN ZIEMER: And that should be made a permanent date and not a --

    DR. ANIGSTEIN: Well, except that it's a living document. We add to --

    CHAIRMAN ZIEMER: No, no. But it should be dated the date it was updated.

    DR. NETON: Make it a PDF.

    CHAIRMAN ZIEMER: I agree with you.

    DR. ANIGSTEIN: It should have also been in PDF file. PDF files won't update automatically.
CHAIRMAN ZIEMER: Right.

DR. ANIGSTEIN: I think we did have a PDF file.

CHAIRMAN ZIEMER: What was the date on this file?

DR. ANIGSTEIN: My date is 10/12/2009.

MR. KATZ: That sounds familiar to me.

MEMBER MUNN: That's what I have. I received it on 10/14 and I downloaded it.

CHAIRMAN ZIEMER: Well, what I notice is this has the NIOSH responses and then it has an SC&A reply. The note I put on the agenda was for Issues 1, 2, 3, 5, and 6, we need to know the impact of the new source-term evaluations on those items.

So I guess what I'm asking here is, Dave, I think we need to find out whether the NIOSH responses still hold true with the new source-term information. Not that you can necessarily answer that now, but do we need to
go back and look at the responses to see if they are still the right ones?

MR. ALLEN: Yes. You've asked for an update on our replies.

CHAIRMAN ZIEMER: Right.

MR. ALLEN: It's being done.

CHAIRMAN ZIEMER: Right, now you had something --

MR. ALLEN: Just asking for the same thing here?

CHAIRMAN ZIEMER: Right.

MR. ALLEN: Okay.

CHAIRMAN ZIEMER: Specifically on Issues 1, 2, 3, 5, and 6, which I think, to some extent, make use of source-term information. What is the impact of that?

And then in turn, if the NIOSH response changes, we need to find out whether or not the SC&A reply changes. So it's kind of a two-step thing, I think.

MR. KATZ: Right. As soon as I have responses from DCAS, I can forward these
on the request to have SC&A review those.

    CHAIRMAN ZIEMER: Did that make sense to the others now? I mean, I don't think it would be fruitful for us to go through all of this based on the old source-term evaluations. Okay, so we'll agree to have NIOSH work that.

    To some extent, you could work that in parallel with the Appendix BB stuff because a lot of it is similar.

    So I don't think it's that big of a differential in terms of the task here that you would undertake.

    MR. KATZ: The same would go for tasking. I would task both of those.

    CHAIRMAN ZIEMER: Right. And then in Issue 4, I have a note here -- review and discuss the SC&A analysis of this issue.

    This issue, I think, remains regardless of what happens on the source-term. This has to do with the film badges that we have. We have already pretty well agreed that
what we have is probably what we're going to have to work with. I guess there, we have the NIOSH response. We have the SC&A reply.

Now we need to determine whether or not the iteration process -- again, I don't know if NIOSH has had a chance to look at the SC&A reply and say, yes, okay, we agree to disagree or where are we on this? So that's on issue 4.

And I neglected to double-check, but I do need to check with the petitioner. Dan, you have a cleared copy of that matrix?

DR. MCKEEL: Dr. Ziemer, this is Dan McKeel. I looked for it this morning. I can't find it. I can't say I never got it, but I couldn't find it this morning. I try to put them all in one place.

CHAIRMAN ZIEMER: The redacted -- or not redacted -- the uncleared copy was issued on the 10th of October. I believe the cleared copy would have been very shortly after that. That would also be on the website,
I believe.

No -- no, the matrix wouldn't be on the website. I take that back.

DR. ANIGSTEIN: The problem here is --

CHAIRMAN ZIEMER: Hang on. Let me -
we want to see if Dan --

DR. MCKEEL: I don't have it with me and I couldn't find it this morning. If someone would resend it, it would be -- I would appreciate it a great deal.

CHAIRMAN ZIEMER: I don't have a cleared copy here. Does anyone have a cleared copy on their -- let me check. Maybe I do have a cleared copy. Hang on just a moment.

MEMBER MUNN: No. Mine still has -- my copy still has the disclaimer on the bottom.

DR. ANIGSTEIN: Can I clarify this?

CHAIRMAN ZIEMER: Yes.

DR. ANIGSTEIN: The policy -- SC&A's policy or rather, SC&A's interpretation
of CDC policy on this issue
is that the matrix is never cleared in the
sense that it is a living document and it can
always be added to.

So there is an October 12th
version in a PDF format, which should have
been the one that was distributed to the Board
-- for some reason, the Word document was
distributed -- which has been reviewed by OGC.
All the information that should have been
redacted was redacted.

However, at the bottom, we still
retain the Privacy Act disclaimer because of
the possibility that, at least to the Word
version, there may be additions, in other
words, we have SC&A reply. It's an ongoing --
there's even a space for Board action,
although normally that has not been filled in.

Consequently, given the fact that
it has the Privacy Act notice, it may be that
it cannot be distributed. We need to get --

MS. HOWELL: It can be distributed,
but the title of the actual document -- like
the Word document title should say whether or
not it's been cleared even though you guys
want to keep the Privacy Act disclaimer on.

DR. ANIGSTEIN: It's up to you
guys.

MR. KATZ: Right, no, we do. We've
been distributing these.

DR. ANIGSTEIN: Yes, because we
went through this before --

CHAIRMAN ZIEMER: Okay, okay.
There's got to be preferred versions
available.

MS. HOWELL: It's supposed to be
noted in the title of the document regardless
of whether --

MR. KATZ: Unrestricted is, I
think, what it says.

MS. HOWELL: Right.

DR. ANIGSTEIN: We have one. It's
entitled -- I have the title. I have it right
here. It's GSI SEC Issues Matrix SC&A Reply
10/12/09 Unrestricted, a PDF.

MR. KATZ: Right, so that you can e-mail to Dan, although I believe it would have been sent to him. But I can understand him not being able to locate it on the spot here.

MS. HOWELL: The title should always indicate either PA-cleared or unrestricted and actually, now they say PA-

MR. KATZ: But anyway, that would be it and that can be e-mailed to him right now.

CHAIRMAN ZIEMER: So the title of that one does say PA-cleared?

MR. KATZ: It says unrestricted.

CHAIRMAN ZIEMER: Unrestricted, okay.

MR. KATZ: Right.

CHAIRMAN ZIEMER: Can you e-mail that to Dan right now?

DR. ANIGSTEIN: No, because I do
not have his -- oh, yes, I can. I can. In a round-about way. I have to go through my Palm --

MR. KATZ: Send it to me, whatever, and I can forward --

DR. ANIGSTEIN: Right this moment?
MR. KATZ: If you send it to me right this moment, I can forward it to him.

DR. ANIGSTEIN: I will do that.

CHAIRMAN ZIEMER: Okay, Dan, we're going to get this to you here.

DR. MCKEEL: That's fantastic. I appreciate it.

CHAIRMAN ZIEMER: We figured out. It's going to go from Bob to --

MR. KATZ: Yes, it will come from me.

DR. MCKEEL: I'm impressed. Thank you.

CHAIRMAN ZIEMER: We hope it maintains its format in going through these different --
DR. MCKEEL: It will. That's great.

CHAIRMAN ZIEMER: Okay, so issue 4 then -- in fact, my copy of this here -- issue 4 was the film badge dosimetry issue.

Here was SC&A's final statement. The issue here is the corrections for the attenuation of incident radiation and the PA orientation when the badge is worn in front are dependent on proton energy. Since the energy spectrum of the residual radiation from the betatron apparatus is unknown, it would be difficult to correct for the exposure geometry.

So at that point, I guess it seems to me what is required here would be for NIOSH to be able to say yes, but this is how we would do that.

The fact that you don't know the energy does not necessarily mean that you can't do this.

DR. NETON: Refresh my memory. This was the winding down of the unit and people
would go in there and there's this sort of capacitor or something that would lead down at the end of the --

MEMBER MUNN: Correct.

DR. NETON: I think that was what it was.

DR. ANIGSTEIN: Yes, well, I have a whole position on this.

DR. NETON: I'm aware, I've gone through that, I think.

DR. ANIGSTEIN: No, we haven't.

DR. MAURO: No, no. We re-analyzed it.

DR. NETON: Oh, you re-analyzed it?

DR. MAURO: Yes. We took a look at it to see what --

CHAIRMAN ZIEMER: Yes, yes, your analysis is pretty much --

DR. ANIGSTEIN: I circulated a report and the answer is we don't know.

CHAIRMAN ZIEMER: Well, I think what you've done is you've eliminated the
probability that it's due to residual capacitance in the machine.

DR. ANIGSTEIN: Right.

CHAIRMAN ZIEMER: So what you're going to default to is short-term nuclides that have been activated, I believe.

DR. ANIGSTEIN: We've looked at all of the possibilities within our models.

In other words, we have modeled the betatron tube itself and there were no -- at least, within the limitations of the MCNPX, and this is a new feature which was added to it in its developmental stage, but they do give you a total inventory of what nuclides have been created during the running time.

The only ones that would fit the bill would be aluminum-28, which is actually part of the -- one of the constituents of the porcelain and one of the platinum isotopes.

CHAIRMAN ZIEMER: Right.

DR. ANIGSTEIN: It tells you how many atoms were created. I modeled that and
calculated a dose of six feet and it's in the fractions of the micro R per hour.

CHAIRMAN ZIEMER: So what's the contact dose?

DR. ANIGSTEIN: Pardon?

CHAIRMAN ZIEMER: What's the contact dose rate?

DR. ANIGSTEIN: The contact dose -- I didn't do contact. I did one centimeter of one of them and it's a two milli --

DR. MAURO: One centimeter is fine.

DR. ANIGSTEIN: Yes, I know it's fine.

CHAIRMAN ZIEMER: No, but I mean six feet is a lot of different --

DR. ANIGSTEIN: No, but I mean, it was reported. The measurement was reported at six feet. It was reported at six feet, 15 mR per hour. We can't come within three orders of magnitude of that. So the answer is we just don't know.

If we go with the factor of 16 mR...
per hour at two seconds after shutdown -- let's say five, ten seconds after shutdown, he ran out there to make a measurement and if there was essentially gone -- if they're nearly zero after 15 minutes, so it would have to be something with a half-life that's measured in minutes. If it's a few seconds, it will be gone before you --

CHAIRMAN ZIEMER: Under two minutes maybe.

DR. ANIGSTEIN: Pardon?

CHAIRMAN ZIEMER: One to two minutes?

DR. ANIGSTEIN: So these two isotopes are the only ones that fit that bill. One -- the platinum was like one something minutes. The aluminum was two point something minutes.

Neither of them -- there's just not enough of it if the MCNPX model is valid. It's the best we've got. It's not -- that aspect of it is not as well tested as other
So the answer is we don't know, to be perfectly honest. He also said that it follows the beam profile -- that it falls off, so with that said, it can't be an isotope. He said there's only one percent going behind the machine. There's only one percent -- the intensity it is in front of the machine.

CHAIRMAN ZIEMER: Well, I guess I would sort of ask NIOSH to think about that. It seems to me you could make the argument if they're able to measure it anyway at six feet, it's not real soft stuff, which is where you get your response of a film badge. Anything above 100 kilovolts is pretty flat.

So if it was that soft, you're not going to be reading it out six feet readily, I don't think.

DR. ANIGSTEIN: Well, if it was -- the original idea -- if it was a 50 KeV -- 60 KeV, if it was a 70 KeV x-ray machine, you would still get a lot of activity at -- sort
of like exposure at six feet. It's not going
to be -- the absorption in the body -- below
50 KeV, essentially nothing gets through. I
mean, nothing is rounded to two decimal
places.

CHAIRMAN ZIEMER: Nothing gets
through.

DR. ANIGSTEIN: Less than one
percent.

CHAIRMAN ZIEMER: Well, sure. That
means it's all absorbed.

DR. MAURO: Right, and you don't
see it under that.

DR. ANIGSTEIN: You won't see it
under that, so that would be our argument --
but yes, the answer is -- you know, you don't
usually hear me say that. We haven't got a
clue.

Whether there was something unique
about that particular measurement, whether
there was something unique about that
particular set-up because the other
information which I'm showing you now that was just discovered -- our associate, Nick Olsher who spent years as a health physicist at Los Alamos and retired recently -- still works part-time and he works for us -- had a discussion. Suddenly, I remember now.

We had this Allis-Chalmers betatron at Los Alamos years back and he said -- now it's coming back to me.

I went in there. I was curious what was going on. One or two minutes after it was shut off, I went in there. So you have another report.

DR. MAURO: Isn't there some language in the manual to the effect that says --

DR. ANIGSTEIN: No. The manual says the tube is radioactive; not that there is activity six feet away. It simply said don't touch. It didn't say stay out of the room. It just said don't touch the tube, meaning for purposes of replacing it.
CHAIRMAN ZIEMER: The tube's activation.

DR. ANIGSTEIN: Yes, yes. There would be activation. The tube has to be replaced.

CHAIRMAN ZIEMER: Well, we won't solve that right here.

MR. ALLEN: No. We've tried to look into that too and managed to find one Russian paper that talked about a 35 MeV betatron machine, uncollimated, and it measured activation in the copper -- copper-62. But the dose rates they were coming up were very small and it's a nine point something minute half-life, which doesn't correlate well with the description we have.

DR. ANIGSTEIN: There is a copper-65 isotope which also Mr. Olsher pointed out. It's very common in accelerators in general for the copper windings. But that has a five minute half-life so that doesn't suit -- that doesn't say, do nothing in 15 minutes.
MR. ALLEN: And then the other thing I found that could explain it but it's very vague is that accelerators were known -- you know, the high magnetic fields and the RF frequencies were known to cause interference.

CHAIRMAN ZIEMER: Well, that's something that's highly likely with the 15 mR per hour.

I've done activations on medical accelerators which are more energetic than this Allis-Chalmers and you get activation of the collimation stuff used in alloy. It's got a lot of different elements in it.

You have to be almost in contact to make the readings. There are a few mR per hour right immediately after a run. Therapy runs can be fairly long sometimes so, you know, they're activated, but see, it's short-lived stuff that all comes to equilibrium pretty fast.

It's not like you're building it up for hours and hours. There's an equilibrium
and then it's gone in a few minutes. You couldn't see it at six feet typically.

But for sure, there's going to be activation. That's something that can be characterized readily and -- well, anyway, we need some kind of response to that though.

I mean, even if you say, well, we don't know, it's a real -- I mean, you can take Bob's analysis, which is very recent. I read through it. You have that. That's got to remain open still.

DR. MAURO: When I was talking to Bob about the report and Bob was explaining to me some of the limitations of MCNPX and the situation we're in where in effect what we have is to the best of our ability to try to model this, we really can't figure out the reason why we're seeing that someone experienced 15 mR per hour became like the way it is.

So what do we have as a circumstance where we have a worker that has
made some measurements, who has reported --

DR. ANIGSTEIN: An engineer.

DR. MAURO: An engineer.

MEMBER MUNN: Engineers are workers too.

DR. ANIGSTEIN: In this report to Sam Glover.

DR. MAURO: Right. Now, when we're in a circumstance like that -- this is Bob and I having a conversation -- reality is we have to use that information. That is, we have to give the benefit.

We don't know enough about the capability of MCNPX to say with certainty that we really know and we've caught everything and that it captures everything that happened.

We have a person that gives us a credible report. I think we have no choice but to accept that.

DR. ANIGSTEIN: And in addition, we model -- we're modeling for this purpose, modeling for the original calculation -- so we
just did a simple model.

The only thing in our model is the platinum target and the tube. Now the machine itself is a big, mammoth machine. We didn't -- we left the rest out because it was just too complicated and we just didn't feel it was worth the labor.

So again, the copper coils, the magnet, the steel, the fixtures -- we're talking about something that weighs probably a pound as opposed to the whole thing that weighs probably a ton. So we're only having a very small fraction of the apparatus.

CHAIRMAN ZIEMER: Well, you're not going to beam out if you're hitting the rest of the apparatus.

DR. ANIGSTEIN: No, of course not.

But there is a lot of side -- the neutrons come up in all directions. We were only interested in the beam at the time we did this.

But I'm saying in the original
model, we used the same model that we originally constructed to get the beam and we didn't bother -- so besides the fact that MCNPX may not be -- because it's a new feature. It may not be completely accurate in characterizing the new nuclides.

We didn't even create a complete model of the whole machine. That's what I'm saying.

CHAIRMAN ZIEMER: Do you know if the neutrons come off from --

DR. ANIGSTEIN: From the target?

CHAIRMAN ZIEMER: -- uniform target?

DR. ANIGSTEIN: Oh, I don't know the target. I don't know the direction.

CHAIRMAN ZIEMER: I don't know. Sometimes that's pretty --

DR. ANIGSTEIN: I do not know the directions.

DR. GLOVER: This is Sam Glover.

The neutrons are highly biased on those
targets.

CHAIRMAN ZIEMER: In the forward direction?

DR. GLOVER: Yes. It's actually very well described in Schuetz's document.

CHAIRMAN ZIEMER: I would have thought. So you're not going to get a lot of activation back into the machinery?

DR. NETON: Sam just sent me an e-mail. He's online as well, but he states -- and I think Bob brought this up before, that there is the same betatron machine at an Army depot.

DR. ANIGSTEIN: Yes, in Pennsylvania.

DR. NETON: And his own contract there? We'll have to visit him.

DR. ANIGSTEIN: We discussed that in one of -- I've been recommending that ever since 68.

But however, discussed that with John and we said, suppose we go, suppose we
get permission and all of that and we go to Letterkenny and somebody from NIOSH drives out and somebody from SC&A such as myself drives from New York which is a convenient place to meet and we find nothing.

This is 2010. How can we say with certainty what that machine in 1960-odd was configured. The circuitry changes periodically, upgraded, so they could have put in a shorting circuit to kill the accelerator.

CHAIRMAN ZIEMER: Sure, and if you're looking at electromagnetic, it could have been a Faraday shield or something.

Okay, well, we'll need to address something there.

DR. GLOVER: This is Sam Glover. Very briefly, Schuetz has a side business -- the man who wrote the document. He maintains these instruments. That's what he does on the side.

I think if there's really anybody who can kind of ascertain if anything has
changed or is it kind of similar, there is a thread if we want to really look at it. So that's all I'll say.

DR. NETON: Sam, we'll get together after this and figure out where we want to go to try to --

CHAIRMAN ZIEMER: In part, the burden will be on NIOSH again to figure out what do we do with this information.

DR. NETON: Right, and I think the key issue was that SC&A was concerned that the photons were low energy, 60 KeV and down and that would be an issue with correcting the badges.

CHAIRMAN ZIEMER: Right. Issue 9 was -- I have a note that SC&A was considering withdrawing this. Let me look at that a moment.

DR. ANIGSTEIN: We withdrew our withdrawal.

CHAIRMAN ZIEMER: Oh, you withdrew your withdrawal, okay. Yes, there is a NIOSH
or an SC&A response here.

DR. ANIGSTEIN: That's the second part of -- the last part of this report that I sent out on Sunday.

CHAIRMAN ZIEMER: Workers may have handled uranium on its way into and out of the betatron but were not assigned a dose to reaction and consequently were not assigned any skin dose. Is that the comment?

DR. ANIGSTEIN: That's part of it, yes. Also, the quick -- we jumped to a quick conclusion during a coffee break during the last Work Group meeting.

We asked if the Putzier effect would not apply to GSI. Based on the discussion we had earlier today with regard to TBD 6000, that it might apply. We had some recasting at Mallinckrodt or Weldon Spring and there were sufficient delays between the purification of the uranium and the remelting.

It doesn't have to be, you know, 100 days for 96 percent. If it's 24 days, you
get 50 percent. Since it's a fifteen-fold effect, even if we have a five-fold effect or a double effect, it's still something that could be significant.

CHAIRMAN ZIEMER: Well, again, I think we need to find out what NIOSH -- if they disagree with that or concur with that or what.

DR. NETON: I'm always trying to remember what we --

DR. MAURO: I think it comes down to -- when you folks originally did your analysis, I guess this Putzier effect was not explicitly addressed.

You're basically looking at slices and you look at the slice and forget about the Putzier.

When we did it, we had a slice also, between we had an edge to have Putzier. But now, I think from information that we've received from Dan and John, there's a good likelihood that these large castings showed
up, are being shot and now all of a sudden, it's not just a little band of four inches wide, it's the full whatever the dimensions are which makes it a larger source.

So I guess my simple understanding of the matter is, well, the exposure from that source could go up to a degree several-fold because instead of being -- well, first of all, it's the Putzier effect, I mean, you've increased it because of that.

Not only that, it's not just a slice, but it's the whole thing that's there, which changes the exposure setting.

DR. NETON: I think earlier in the day, we agreed to revise our write-up in TBD-6000 about the Putzier effect and all these different forms.

MR. ALLEN: I've just kind of looked up -- because I'm pretty sure when we exposed the beta dose and the uranium, I think we used the TBD-6000 value. I might be wrong. I'm still looking here.
DR. NETON: Right.

MR. ALLEN: Okay, you've got it covered.

DR. NETON: Still need to amend TBD-6000 when it describes --

DR. ANIGSTEIN: I can't get HHS mail or connect, but I do have it here if someone has it -- I can give it to someone else.

CHAIRMAN ZIEMER: What is that?

DR. ANIGSTEIN: I have -- I can't -- Ted asked me to e-mail it to him and for whatever reason, I can't connect to HHS mail.

MR. KATZ: The matrix.

DR. ANIGSTEIN: Pardon me?

MR. KATZ: Yes, so if Paul or someone could put it on theirs and e-mail it to me, that could work too.

CHAIRMAN ZIEMER: Is this the thing for Dan?

MR. KATZ: Yes, it is. You have to save it to the other and --
DR. NETON: I can't access my C drive at all.

MR. KATZ: That's weird. I can't --

CHAIRMAN ZIEMER: Do you want to bring that over here? We've got too many people talking at a time for the Court Reporter.

Dan, we haven't been successful yet, I guess, in getting this out.

DR. ANIGSTEIN: It's not a simple thing but if it's encrypted.

CHAIRMAN ZIEMER: This is encrypted?

DR. ANIGSTEIN: Right. That's what I was told.

CHAIRMAN ZIEMER: In what sense is it encrypted?

DR. ANIGSTEIN: You have to run a program.

MR. KATZ: Why don't you do it with Mark so that Paul can -- do it with Mark's computer. That way Paul can --
CHAIRMAN ZIEMER: Okay --

DR. MCKEEL: Don't worry about it. I'll -- you all need to get your work done.

CHAIRMAN ZIEMER: We're going to get it done one way or the other.

DR. MCKEEL: I appreciate the effort.

CHAIRMAN ZIEMER: An issue -- okay, that was issue 9. Issue 10, the NIOSH response was that this was not an SEC issue. It has to do with accuracy of dose estimates and therefore it's really an Appendix BB issue.

Well, it's lack of consistency in the signing external exposures, so it has to do with the modeling. It probably should be moved to the Appendix BB matrix.

So let's agree to do that and then we will need -- and see NIOSH's response to SC&A was move it, but they weren't responding to the issue so you will need a -- this will need to become a new issue under Appendix BB.
We'll agree to move issue 10 to Appendix BB and address it there.

And that's the assignment of external exposure, so to some extent, you're going to be covering that anyway in your other issues, Dave.

MR. ALLEN: Yes, I think our response is going to be --

CHAIRMAN ZIEMER: -- take care of this one.

The next thing I had on our list here was to identify or consider any related petition or concerns on the SEC petition so, Dan, again, I want to ask you if you have additional items that you want to call our attention to outside the matrix itself or within the matrix as well. That's fine.

DR. MCKEEL: Paul, this is Dan McKeel again. I prepared a document that I sent to you all. It has to do with the various documents at GSI. What I intended on that was that that also included the SEC matrix. I did
have some additional items that concerned me, but I don't have that with me and ready to discuss today.

CHAIRMAN ZIEMER: I do know that you -- to some extent, you covered some of those in the document that we already went through.

DR. MCKEEL: You did. I did.

CHAIRMAN ZIEMER: So I was just saying are there any other ones that -- certainly you'll have the opportunity because we have a lot of work to do on this matrix yet.

DR. MCKEEL: I think we've covered them. The overarching issue, as far as I'm concerned, that has to do with the SEC petition is really two things.

One -- and I understand that they're being addressed -- but one is that we do not have monitoring data for 10 of the 13 years of the covered period. That's big.

Second one is that even in the new
White Paper, not all of the radiation sources have been covered. Again, if everyone accepts the testimony that there was an iridium-192 source, that hasn't been modeled or the dose calculated.

And if one accepts that there were -- and this was in the license -- that there were two, at least, portable conventional industrial x-ray sources there, and the fact that they literally could have been used anywhere in the plant, then I think those doses also have to be calculated. So the sources need to be determined, all of them. But I assume that that will come out as the work progresses.

CHAIRMAN ZIEMER: Right. I think those -- I'm looking back here in the matrix -- as to whether those are explicitly incorporated into the findings but certainly those will come out in terms of the issues we've already discussed for Appendix BB.

DR. MCKEEL: Okay, that's fine.
CHAIRMAN ZIEMER: Thank you.

DR. MCKEEL: Thank you.

CHAIRMAN ZIEMER: I think we've identified the path forward on the items as we've gone along so we're okay on that. I do want us to turn to Bliss and Laughlin. Sam Glover, are you still on the line?

DR. GLOVER: Yes, sir.

CHAIRMAN ZIEMER: Sam, at our last meeting, we learned -- and I don't know if the Petitioner is on the line or not. Is the Petitioner for Bliss and Laughlin on the line?

At our last meeting, we learned that the Petitioner had a different version of the Evaluation Report than the one we were using.

In the transcript of those minutes, what we said was that the Petitioner would mail his version of the Evaluation Report to Ted so that Ted could identify why his copy was different from the covered -- it was different about the covered dates and the
levels.

MR. KATZ: Never received anything.

CHAIRMAN ZIEMER: So you never received that, Ted, apparently. Somehow he had a document and he read to us from it. What he read for the covered period was very different than -- I mean, it was different. It was different from the official covered period.

Then the other thing in the transcript was it said that NIOSH would indicate whether they intend to do another data capture to look -- oh, that was related to -- that wasn't related to Bliss and Laughlin. That was for the other facility.

There was an indication and I don't know if this has occurred. John, you talked about the possibility that you would be meeting with former workers?

DR. MAURO: On Bliss and Laughlin?

CHAIRMAN ZIEMER: Yes.

DR. MAURO: Yes. That's -- we're
trying to schedule that in.

    CHAIRMAN ZIEMER: That hasn't occurred yet.

    DR. MAURO: That has not occurred. It's in the queue but it hasn't occurred yet.

    CHAIRMAN ZIEMER: We wanted to determine whether a formal review and findings matrix was needed for Bliss and Laughlin. I think part of that was going to await what you learned from the workers.

    DR. MAURO: We have a Bliss and Laughlin SEC Petition Evaluation Report review completed. I think it's probably at DOE right now. It was finished up and sent to DOE. You'll be getting it when it comes back.

    CHAIRMAN ZIEMER: So there would be a findings matrix?

    DR. MAURO: Yes, but there won't be the attachment that includes the results of the interviews because the interviews always lag behind.

    CHAIRMAN ZIEMER: Yes.
DR. MAURO: But you will be getting that as soon as it comes back from DOE.

CHAIRMAN ZIEMER: Okay. So probably by the time of the next meeting, we would have a findings matrix.

DR. MAURO: Oh, yes.

CHAIRMAN ZIEMER: In terms of the Petitioner, I think the burden was on him to send that in, but he knows that the document he has was not correct.

MR. KATZ: This is a long time now. I will get in touch with the SEC Petitioner, Laurie Breyer, and find out if she can't speak with him and sort this out.

CHAIRMAN ZIEMER: Do you know who it is?

MR. KATZ: I don't, but I'll get that from Laurie.

CHAIRMAN ZIEMER: Okay, all right.

MR. KATZ: Are there more than one Petitioners for this site?

CHAIRMAN ZIEMER: Okay, so --
DR. MCKEEL: Dr. Ziemer?

CHAIRMAN ZIEMER: Yes?

DR. MCKEEL: This is Dan McKeel.

I'm sorry to interrupt.

CHAIRMAN ZIEMER: That's all right.

DR. MCKEEL: I just noticed that under item 4E, the interview that you had with the site expert -- I don't think we covered that. I just wanted to remind you that that's on the agenda whether you want to cover that or not.

CHAIRMAN ZIEMER: Well actually, I put it on the agenda but I wasn't certain we needed to cover it. Let me say why.

DR. MCKEEL: Okay.

CHAIRMAN ZIEMER: I have provided copies of that interview to the members of the Work Group.

DR. MCKEEL: That's great.

CHAIRMAN ZIEMER: I believe you have a redacted copy.

DR. MCKEEL: Yes, sir. That's true.
That's fine with me.

CHAIRMAN ZIEMER: It turned out in my mind that much of what we did there was a moot point since we found these other documents which give us much more.

The original purpose of the interview was to find out of we could establish the size of the iridium source based on distances used to rope off the area.

DR. MCKEEL: Yes.

CHAIRMAN ZIEMER: What I learned in the interview was, 1) that that individual was not actually involved with an iridium source so I provided the other information that he gave to me about the sources he was familiar with. Plus, I think there was information about the outside group that came in and did some radiography.

But as far as I can see, there's no information there that is more helpful than that that you were able to gather from the license materials.
DR. MCKEEL: That's fine.

CHAIRMAN ZIEMER: Yes.

DR. MCKEEL: Okay, thank you.

CHAIRMAN ZIEMER: We do all have a copy of that.

DR. MCKEEL: Yes, okay, good.

CHAIRMAN ZIEMER: Okay, thank you.

Let me ask if there's any other items that need to come before us today?

MR. THURBER: Mr. Ziemer, this is Bill Thurber.

CHAIRMAN ZIEMER: Yes, Bill?

MR. THURBER: A comment on the Bliss and Laughlin report which you all will be getting momentarily as John said, when you get it, you will see that the analysis by NIOSH and our critique of their analysis is closely intertwined with TBD 6000.

Some of it deals with inabilities to interpret what TBD-6000 says. Some of it deals with unsubstantiated positions or approaches to data taken in TBD-6000. Some of
it deals with the fact that in one place, TBD-6000 says do this. In another place, it says do that.

I would hope that even though these things are not necessarily or have not necessarily been part of the TBD-6000 matrix, that as the document does get revised by NIOSH that these things will get picked up and be corrected as well.

CHAIRMAN ZIEMER: Thank you for that comment. I think that, for example, you pointed out a contradiction within TBD-6000 that certainly whatever that is, we'll want to take care of that and pick that up in any revision.

The same would be true if there's other issues outside of what we've already talked about because we don't want to keep doing iterative revisions every time we do a TBD subset.

MR. THURBER: Exactly.

CHAIRMAN ZIEMER: So we appreciate
getting those early on and then --

    DR. MAURO: They're close.

    CHAIRMAN ZIEMER: Particularly if there's something that's very obvious. When you talk about a contradiction, it seems to say do something this way and do something that way.

    MR. THURBER: Right.

    CHAIRMAN ZIEMER: Or maybe it doesn't and you think it does, so we'll find that out.

    MR. THURBER: Which may be true as well. Exactly.

    CHAIRMAN ZIEMER: Very good. Any other comments?

    (No response.)

    CHAIRMAN ZIEMER: I thought we would go to five-ish. Surely there's more comments. Well, that's what happens when you start an hour early. If not, I thank you all again. I thank those on the phone who participated, and we are adjourned.
(Whereupon, above-entitled matter went off the record at 4:10 p.m.)