

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

+ + + + +

ADVISORY BOARD ON RADIATION AND  
WORKER HEALTH

+ + + + +

WORK GROUP ON TBD-6000

+ + + + +

TUESDAY  
OCTOBER 12, 2010

+ + + + +

The Work Group convened in the Zurich Room of the Cincinnati Airport Marriott, 2395 Progress Drive, Hebron, Kentucky, at 9:00 a.m., Paul L. Ziemer, Chairman, presiding.

PRESENT:

PAUL L. ZIEMER, Chairman  
JOSIE BEACH, Member  
WANDA I. MUNN, Member

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ALSO PRESENT:

TED KATZ, Designated Federal Official

ZAIDA BURGOS, NIOSH\*

JOHN DUTKO\*

JENNY LIN, HHS

JOHN MAURO, SC&A

DAN MCKEEL, Petitioner\*

MICHAEL RAFKY, HHS\*

JOHN RAMSPOTT\*

WILLIAM THURBER, SC&A\*

DAVE ALLEN, NIOSH

JIM NETON, NIOSH

ROBERT ANIGSTEIN, SC&A

\*Participating via telephone

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## T-A-B-L-E O-F C-O-N-T-E-N-T-S

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

2 (9:08 a.m.)

3 CHAIRMAN ZIEMER: Okay, thank you  
4 everyone for participating today. I want to  
5 make sure everyone has a copy of the draft  
6 agenda. If you don't have it, it is on the  
7 OCAS/DCAS -- I guess it's still called OCAS.  
8 The website is called OCAS, but it's -- the OCAS  
9 website has today's agenda on it.

10 It's still called a draft agenda,  
11 but I got no comments from anyone. I'm  
12 modifying it so it will stand as our agenda  
13 today. The plan is to go through the agenda. I  
14 haven't put specific times on there for each  
15 item, since it's a little difficult to predict  
16 how long each item will take.

17 We're also quite flexible. If I've  
18 omitted some sort of a subset of any of these,  
19 our intent is to be fairly inclusive. You'll  
20 note that we are using somewhat the same

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1 structure as we have in the past. That is to  
2 look at the TBD-6000 matrix, then to focus on  
3 Appendix BB, General Steel Industries, which  
4 involve both the issues matrix on the TBD -- or  
5 the Appendix BB document, as well as the issues  
6 dealing with the SEC petition.

7 Then I also have put Bliss &  
8 Laughlin on the agenda, and we do have a  
9 document from SC&A, which we've had for a little  
10 bit of time, which is their review of the  
11 Evaluation -- Petition Evaluation Report, and I  
12 want to at least take a look at those findings  
13 today, and get a preliminary look underway on  
14 that document.

15 Now, just for convenience, I have  
16 prepared a list of 12 documents that probably  
17 will be pertinent to our discussion today. Ted,  
18 I have just emailed you those. And if you could  
19 -- well, let me ask Dan McKeel and John Ramspott  
20 if you have access to your email today. We'll  
21 email those to you immediately. It's just a  
22 list of documents that we want to have before

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1 us.

2 DR. MCKEEL: Paul, this is Dan  
3 McKeel. I do have access to the laptop.

4 MR. KATZ: Okay, good. I'm going to  
5 forward it to you, Dan.

6 MR. RAMSPOTT: This is John  
7 Ramspott. I do as well.

8 CHAIRMAN ZIEMER: Okay, when -- when  
9 Mark and -- well, why don't you forward this to  
10 Mark and John Poston as well.

11 MR. KATZ: Yes, of course.

12 CHAIRMAN ZIEMER: Now, let me just  
13 tell you what's on the list, and this will also  
14 be useful, I think, as we go through our  
15 discussion because we have a lot of documents  
16 that have sort of come in since the last  
17 meeting. A couple of these are carryovers from  
18 the last meeting, and I've put them pretty much  
19 in the order that we've received the documents,  
20 with the exception of the last one, which is the  
21 SC&A report on Bliss & Laughlin.

22 So, that's at the end of the list,

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1 simply because that's where it will be on the  
2 agenda. The rest of these items have to do with  
3 TBD-6000 matrix, as well as General Steel  
4 Industries.

5 And just for the record, I've gone  
6 back to May 9th, which was before our previous  
7 meeting, but we didn't really have a chance to  
8 look in complete detail at that document. We  
9 have an SC&A -- I called it an information paper  
10 because it's not labeled as a White Paper, and  
11 it's called, "Response to Action Items Related  
12 to General Steel Industries, SEC Issues Matrix,"  
13 and that's dated May 9th.

14 We have a NIOSH White Paper that  
15 Dave Allen prepared, called Portable Radiography  
16 Sources at GSI, dated May 2010. The document  
17 itself doesn't have a day, but it had a May 2010  
18 date, and I might parenthetically say that some  
19 of that may be obsolete. We don't know yet,  
20 depending on another document, which shows up  
21 later on the list.

22 We have an email letter from Dan

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1       McKeel, dated May 9th, and the reason that's in  
2       there is because that letter -- the subject of  
3       that email is called, "McKeel Rebuttal of  
4       5/16/10 NIOSH White Paper on GSI Isotopes." So,  
5       I want to make sure you have that document.  
6       This was the petitioner's concerns about that  
7       White Paper, although again some of that may  
8       change with the new document.

9                       We have a June 6th letter from  
10       petitioner   McKeel,   called,    "New   Source  
11       Activation from both GSI 24-25 MeV Betatrons."  
12       I did put on the document here, "Email letter  
13       from Stu Hinnefeld to Dan McKeel, subject --  
14       well, the subject is as it is on the email. It  
15       says, "Hours Appendix BB versus new GSI White  
16       Paper second request." It's dated September  
17       18th. That was a reply that Stu Hinnefeld made  
18       to Dan McKeel, concerning the revision process.

19  
20                       We need to be cognizant of what was  
21       said in that letter, in terms of when the actual  
22       revision will occur, and it has to do with the

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1 wrap up of all the outstanding items on that.

2 And then the SC&A draft White Paper,  
3 dated September 27th, called, "Review of NIOSH  
4 White Paper on Portable Radiography Sources at  
5 GSI." And again parenthetically, they're  
6 reviewing that original White Paper, which might  
7 change with the new material. But nonetheless,  
8 I think it's before us.

9 Then we have a White Paper prepared  
10 by Dave Allen, a NIOSH White Paper, called TBD-  
11 6000 Working Group Puzier Effect," dated  
12 September 30th, 2010. This is the proposed  
13 wording that would go in the revision of TBD-  
14 6000.

15 We have NIOSH -- I call it an  
16 information document, prepared by Dave Allen.  
17 This is very recent. It has an October date on  
18 the document itself. It just says October 2010  
19 on the document. It's called, "Path Forward for  
20 GSI Appendix and ER Review."

21 We have SC&A Issues Resolution  
22 Matrix for SC&A findings on TBD-6000. This is

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1 an update. We've had an ongoing version of  
2 this. So, this is the latest update of this.  
3 It was updated October 7th, 2010, and I believe,  
4 as we go along here, if -- if the petitioners  
5 are missing any of these, we need to know. I  
6 think all the PA cleared copies on these things  
7 have gone out, as far as I could tell from the  
8 email discussions.

9 I call attention to two papers that  
10 were highlighted by the petitioner. One was --  
11 one was by Graham Stevenson. It's a CERN paper  
12 called, "Induced Activity in Accelerator  
13 Structures Air and Water." Was provided to us -  
14 - actually, it looked like a PowerPoint  
15 presentation, but it was provided by the  
16 petitioner with regard to concerns about induced  
17 air activity.

18 Then another, what was an abstract,  
19 by Harder. The abstract was -- abstract of a  
20 paper, entitled, "The Measurement of Air  
21 Activation Produced by Betatron Radiation."  
22 Then a German publications called,

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1 "Strahlentherapie 59," and we got the abstract,  
2 which came out of Energy Citation's database.

3 Again, that was simply to give us  
4 the heads up on air activity issue. And then  
5 finally, I cited the Bliss & Laughlin SC&A  
6 document that reviews the Petition ER.

7 So, those are the 12, I think,  
8 documents that are sort of on our -- on our  
9 plate here, some of which are more pertinent  
10 than others, but nonetheless, just seeing it  
11 might help you sort of structure. Because we  
12 have three parallel things going on. We have  
13 the -- the TBD-6000 main document. We have  
14 Appendix BB, and then we have the GSI SEC  
15 Petition, and then we have the Bliss & Laughlin  
16 Petition.

17 So, all of those items are on our  
18 plate at the moment.

19 MEMBER BEACH: All this is very  
20 helpful. Thank you.

21 MR. KATZ: Let me just check in with  
22 -- Dan, I emailed it to you. John, I don't have

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1 my email address on my PDA, but I asked Dan if -  
2 - I imagine he has your email address, if he  
3 could forward it to you. Dan, if you don't, we  
4 need to get John's --

5 DR. MCKEEL: I can forward it, yes.

6 MR. KATZ: Thank you very much.

7 DR. MCKEEL: I would mention that  
8 item -- paper number 9 that Paul mentioned, the  
9 SC&A TBD-6000 updated matrix. I don't seem to  
10 have that. I may have missed it, but I didn't  
11 see that. I don't have that.

12 CHAIRMAN ZIEMER: That was  
13 distributed just in the last -- it's dated  
14 October 7th. So, that's very recent, within the  
15 week.

16 MR. KATZ: It may not have made it  
17 through clearance.

18 DR. MCKEEL: Okay. I don't -- I  
19 don't have it. So, when is it --

20 CHAIRMAN ZIEMER: Actually, what it  
21 has on it is the outcomes of our last meeting.  
22 Okay, we've learned that it has been cleared.

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1 So, we'll try to get that out to you.

2 DR. NETON: It looks like 4:15 on  
3 Friday was the cleared version.

4 Okay, we're going to try to get that  
5 to you, Dan and John, here shortly.

6 DR. MCKEEL: No problem.

7 MR. RAMSPOTT: I just received an  
8 email from Chris Ellison at 8:08 this morning.  
9 So, that might be it.

10 MR. KATZ: Oh, that might be it. I  
11 think I may have sent her an email asking to  
12 forward it.

13 MR. RAMSPOTT: Date at issue matrix  
14 for TBD-6000 PA cleared.

15 MR. KATZ: That's it.

16 MR. RAMSPOTT: I just received it.

17 MR. KATZ: Right. So, she should've  
18 sent it to Dan as well.

19 DR. MCKEEL: Okay.

20 MR. RAMSPOTT: I'm going to forward  
21 it just to be safe, Dan.

22 DR. MCKEEL: Thank you.

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1                   CHAIRMAN ZIEMER:     Good.     I think  
2     we're all on the same page then.     Good.     Okay,  
3     follow up items from our last meeting on the  
4     TBD-6000 findings matrix, and the first one I  
5     have here is the NIOSH White Paper that Dave  
6     Allen prepared on the Puzier effect.

7                   So, let's get that paper out, or  
8     pull that out, or whatever you have to do.  
9     Sorry for the delay here.     The Chair is having  
10    trouble finding his own copy, but I now have it.

11    What I'd like to do -- well, let me point out  
12    first that what was agreed upon last time was  
13    that we would add to the revised TBD-6000  
14    wording dealing with the Puzier effect.

15                  There was some recognition that time  
16    that it -- it may not in all cases affect the  
17    whole body exposure, but it certainly might in  
18    the case of arm or hand exposure.     And I guess  
19    there were two parts to it.     One was the  
20    discussion of what the affect is, and when it  
21    applies, and the other part is this table, and  
22    the table is part of what we go in, right?

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1                   MR. ALLEN:    This table is in the  
2    White Paper?  No, it was a little background --

3                   CHAIRMAN ZIEMER:  It was a little  
4    background table.  So, the only thing that would  
5    go in that relates to the table is the ratio  
6    that would be used for badge readings to -- I  
7    guess it was badge readings to beta dose is what  
8    it was.

9                    Anyway, so the part that is proposed  
10   for insertion into the document starts with the  
11   highlighted thing proposed language with TBD-  
12   6000.  And so, I would ask Work Group Members  
13   have you had a chance to read through it, and  
14   are there questions on it at the moment, or  
15   concerns?  I'll ask the same of -- I assume SC&A  
16   has had a chance to look at this too.

17                   We haven't asked you for a formal  
18   review, but it's rather brief.  If you have  
19   comments or concerns, you should raise those as  
20   well.

21                   DR. MAURO:  We'll wait.  We have  
22   discussed it, but we'll wait for the Work Group

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1 Members.

2 MEMBER MUNN: I've read it. I  
3 didn't have any questions at the time. I can't  
4 pull it up now. I'll find it.

5 CHAIRMAN ZIEMER: Josie?

6 MEMBER BEACH: So this proposed  
7 language, the whole -- the whole thing --

8 CHAIRMAN ZIEMER: Starting with the  
9 highlighted proposed language and I believe  
10 through the references. Would include the  
11 references.

12 MEMBER BEACH: All that is going to  
13 be in --

14 MR. ALLEN: TBD-6000, wherever it  
15 fits right. I mean it'll be probably a small  
16 section or subsection in there. The references  
17 are going to be in the reference section. It  
18 will be -- it will be kind of blended into the  
19 document.

20 MEMBER BEACH: I didn't have any  
21 questions at this time.

22 CHAIRMAN ZIEMER: Okay, SC&A?

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1 DR. MAURO: Yes. Bill Thurber and  
2 I, in fact, we had quite a discussion. The  
3 ratio, the 10 to 15 fold ratio of the beta that  
4 the Puzier effect sometimes -- sometimes you  
5 see. And the fact that TBD-6000 has built into  
6 it, certain default assumptions that are  
7 extremely conservative captures it.

8 So, I mean we went through this the  
9 last time at the last meeting.

10 CHAIRMAN ZIEMER: Yes, we had an  
11 extensive discussion last time.

12 DR. MAURO: Right. So, I don't want  
13 to go -- but I just want to get ourselves  
14 grounded. The only thing we discussed on  
15 Friday, and Bill, you could certainly jump in,  
16 was there was actually an internal disagreement  
17 within SC&A whether or not that also applies to  
18 gamma.

19 And it seems that all the language  
20 you read when you read the Puzier report, and  
21 the material here, the main emphasis has always  
22 been on beta. And it seems to us that this all

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1 -- now, I'll bring it to the end. This also of  
2 course should apply to gamma, even though when  
3 you read the Puzier articles, I don't recall  
4 ever seeing some language that says, "We're also  
5 seeing elevated gamma and bremsstrahlung," as  
6 one might, in theory, expect, for the same  
7 reason you're seeing the elevated beta.

8           However, when you look at the photon  
9 or penetrating radiation default values in TBD-  
10 6000, they also are extremely high, the median  
11 and the 95th percentile. So, for all intents  
12 and purposes, that document captures Puzier  
13 also, just like the beta does. Just like it  
14 captures beta.

15           So, in a funny sort of way, though  
16 we never really talked about it, I don't think,  
17 it seems that it's covered. Bill, did I  
18 communicate that correctly?

19           MR. THURBER: Yes, I agree with what  
20 you said, John. You know, the literature  
21 commonly -- not only the original Puzier  
22 reference that we've used a number of times, but

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1 the other authors typically talk about -- about  
2 the beta dose, but conceptually, theoretically,  
3 there should be an intended increase in gamma  
4 dose.

5 I think that actually while it  
6 wasn't discussed in this particular context,  
7 that David Allen, I think, looked at the gamma  
8 dose as well in one of his series of papers that  
9 related to this topic. So, yes, I think that  
10 captures it.

11 DR. MAURO: And I know in many of my  
12 reviews of dose reconstructions, I have -- one  
13 of my comments always has been, "Have you  
14 addressed the gamma component?" So, it's been  
15 on the table but in the background.

16 CHAIRMAN ZIEMER: Are you talking  
17 specifically about the increase due to  
18 bremsstrahlung?

19 DR. MAURO: Both. In other words,  
20 picture the thorium. Thorium's on the outside.  
21 You're going to get the bremsstrahlung because  
22 the betas are on the outside. But still, the

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1 photons -- there's a strong photon that comes  
2 off of -- part of the field, the penetrating  
3 field.

4 CHAIRMAN ZIEMER: Right, right.

5 DR. MAURO: Now, we had a discussion  
6 on it, and we sort of left at the place where it  
7 was our sense that it probably is there, but we  
8 really never talked too much about it.

9 CHAIRMAN ZIEMER: Well, let me just  
10 comment. This is top of the head now, but keep  
11 in mind on bremsstrahlung, let's take something  
12 like P-32, which has a very energetic beta.  
13 Doesn't apply here specifically, but the idea  
14 does.

15 Generally, if you're concerned about  
16 the photons generated, that only is a concern if  
17 you've blocked out the betas completely, say  
18 with a high Z material, and now you're looking  
19 at the bremsstrahlung. But the output, the  
20 bremsstrahlung output, is always orders of  
21 magnitude lower on a strontium or P-32 source,  
22 where you could have thousands of rads per

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1 minute. Say, an eye applicator for strontium-  
2 90. But if you block that out completely, your  
3 photon dose is way, way lower than that.

4 DR. ANIGSTEIN: That's not the same  
5 for uranium, but we've modeled that extensively.  
6 And typically, you get about half and half  
7 because the uranium -- uranium itself, forget  
8 about photons, but when you get the thorium-234  
9 and protactinium-234m, and also protactinium-  
10 234, which is usually not mentioned,  
11 protactinium-234 only accounts for 0.16 percent  
12 of the -- 1.6 times ten to the minus three of  
13 the uranium decay. However, it accounts for 10  
14 percent of the gamma that comes off from the  
15 short-lived progeny.

16 CHAIRMAN ZIEMER: Yes, you're  
17 talking about the decay process, I'm only  
18 talking about the bremsstrahlung part.

19 DR. ANIGSTEIN: But also, since all  
20 of these products, thorium-234, protoactinium-  
21 234m and protoactinium-234, they all decay by  
22 beta emission, they have very energetic betas

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1 also.

2 So, the -- location-wise, in the  
3 ingot, the betas and the gammas arrive from the  
4 same place. It arrives from wherever these  
5 short-lived decay products are localized, and  
6 you get roughly equal amounts of dose from the  
7 bremsstrahlung X rays and from the primary  
8 gammas that come out of these same nuclides,  
9 unlike strontium-90, where there's virtually no  
10 gammas. It's like one -- ten to the minus-six  
11 gammas. So, it's a different animal.

12 CHAIRMAN ZIEMER: I'll have to think  
13 about that.

14 DR. ANIGSTEIN: I happen to know  
15 because I, just in the past year, did detailed  
16 modeling and experiments on strontium-90 for  
17 purposes of detecting internal contamination for  
18 CDC.

19 DR. MAURO: When we discussed it, a  
20 model in our heads, and said, okay, now you've  
21 got this ingot, and all the protactinium and  
22 thorium are uniformly mixed with uranium. No

Note: When  
as a noun,  
has no hyp  
When used a  
adjective (  
X-ray image  
does.

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1 Puzier effect, okay? And you know that the  
2 radiation, the penetrating radiation field, one  
3 foot away, is about 2 mR per hour, and the  
4 contact dose, total beta gamma contact dose,  
5 without the Puzier effect, is about 200 mR per  
6 hour.

7 Now, we know from the Puzier effect  
8 that the contact dose goes up by a factor of 10  
9 to 15, and that's the beta component. And one  
10 would say, "Okay, so what's going on?" Well,  
11 you have all the thorium, strong betas up there  
12 close in service. How close? I don't know, but  
13 it's pretty close because you're seeing -- you  
14 know it has to be pretty close. Otherwise, it's  
15 going to be shielded. You're not going to  
16 really see that kind of effect.

17 So, it's up there in the close to  
18 the outside surface. Now, question becomes the  
19 fact that those betas from the thorium are up  
20 there close; is it possible that those very same  
21 betas that cause the bremsstrahlung and the X  
22 rays, and the photon that comes off in the

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1 protactinium are also close to the surface? Are  
2 we going to see an elevated level of the two mR  
3 per hour in one foot?

4 And it's -- and it's -- the more I  
5 think about it, the more I think, well, you  
6 should. But the important point is it doesn't  
7 change anything because your default values are  
8 up. Default penetrating are up also. I just am  
9 not sure of the physics of it.

10 CHAIRMAN ZIEMER: Right, right. And  
11 these numbers in the table, though, are measured  
12 numbers, are they not? They're not theoretical  
13 numbers.

14 MR. ALLEN: They're both.

15 CHAIRMAN ZIEMER: They're both?

16 MR. ALLEN: The TBD-6000. I'm  
17 talking about the Fernald and Mallinckrodt, and  
18 ElectroMet are measured.

19 DR. MAURO: Those are measured.

20 MR. ALLEN: And the bottom one is a  
21 theoretical, and the TBD-6000 is a model,  
22 essentially. But there is a competing effect

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1 with that bremsstrahlung. I mean,  
2 bremsstrahlung is two components. You got to  
3 have a high energy beta, and it's got to be in  
4 close approximation to a high Z material. And  
5 if you put all the high energy beta measures on  
6 the service --

7 DR. MAURO: You're not hitting  
8 anything.

9 CHAIRMAN ZIEMER: At least not in a  
10 forward direction.

11 MR. ALLEN: Right, it is going to be  
12 somewhat directional into the ingot versus when  
13 it's intermixed, you're producing more -- more  
14 bremsstrahlung. You're also shielding --  
15 there's several competing of factors here.

16 DR. MAURO: One of the things that  
17 can -- I'll make a real -- I remember one of  
18 your numbers up in the 95th percent for Fernald  
19 was 12 rem per year penetrating. I think that  
20 was the number. That might ring true. I'm not  
21 looking at that right now.

22 MR. THURBER: Yes, 12.3.

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1 DR. MAURO: There you go. Now, you  
2 wouldn't get 12.3 -- now think about it like  
3 this. If the exposure occurs -- the penetrating  
4 dose from pure uranium without Puzier is 2 mR  
5 per hour at a foot. Now, you're not going to  
6 get 12 rem, right? I mean that was a real  
7 measured value. That was the upper 95th  
8 percentile, unless something else is going on.  
9 That's pretty -- that's up there.

10 You wouldn't get 12 rem a year if  
11 you were being exposed to 2 mR per hour, right?

12 Two-thousand hours per year, what are you going  
13 to get?

14 MR. THURBER: Well, do 1,000 hours  
15 per year because it's 50 percent of the time in  
16 contact.

17 DR. MAURO: And what do you come up  
18 with?

19 MR. THURBER: The arithmetic is  
20 easier.

21 DR. MAURO: Do it that easier that  
22 way.

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1 MR. THURBER: It's 2 R per year.

2 DR. MAURO: I can't handle it that  
3 way. Well, the idea being something else is  
4 going on to get to 12 rem. I don't know what  
5 that -- so, that sort of gave me an indication  
6 that maybe Puzier is going on for photon.

7 DR. ANIGSTEIN: Of course it does. I  
8 can speak from one experience, I mean, second-  
9 hand experience. It is when they did vacuum  
10 induction casting of uranium, scrap uranium  
11 metal, with a company that was working at Rocky  
12 Flats -- that took -- I think it was depleted  
13 uranium. It doesn't matter. And they did  
14 vacuum casting -- it was a vertical mold, and so  
15 they would melt the uranium, and then they would  
16 drain it out the bottom.

17 They would leave behind something  
18 they referred to as a skull. That's exactly  
19 what it looked like. It was a thin shell that  
20 coated the inside of the mold. It's mass was 1  
21 percent of the mass of uranium, and they called  
22 it hot. That's where all the activity, all the

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1 short-lived activity concentrated, and of course  
2 you had your gammas as well as the  
3 bremsstrahlung, as well as your betas coming  
4 out.

5 But they were concerned with the  
6 gammas because they had to, you know the  
7 operator had to be shielded, or had to take that  
8 into account. So, it was not a microscopically  
9 thin layer. It wasn't like a monatomic layer.  
10 And the question comes up from the gammas.

11 The extreme case, and if I wanted to  
12 model it, along with back of envelope modeling,  
13 I would say what if all the short-lived activity  
14 is on the surface? Not in a microscopic thin  
15 layer, but within the thickness, so that which  
16 is essentially transparent to the gammas.

17 So, you could have material a little  
18 bit under the surface. You could have enough of  
19 a layer, because it doesn't take much to screen  
20 out the betas, probably with that heavy material  
21 -- I'm just thinking of the number. My guess is  
22 a millimeter will probably screen out the betas,

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1 but not the gammas.

2 So, in theory, you could even have a  
3 greater elevation of the gammas. I could  
4 probably do parametrically a study, showing how  
5 a change -- now, assuming that all the  
6 activities and all the beta and gamma activity  
7 is on the surface, and then gradually increasing  
8 the layer, and we have to get a maximum ratio.  
9 The beta/gamma ratio could maximize, or I should  
10 say the gamma/beta ratio could maximize.

11 So, you could have a lot more gammas  
12 coming out, where the betas are absorbed, and  
13 you'll still get -- when I say gammas, I should  
14 actually say photons. So, there is no --  
15 theoretically, there is no simple way of  
16 limiting this.

17 CHAIRMAN ZIEMER: Well, also keep in  
18 mind that bremsstrahlung is not monoenergetic.  
19 It's a distribution, majority of which is low  
20 energy. So, it's very different from the  
21 photons coming out.

22 DR. ANIGSTEIN: They are about the

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1 same energy spectrum because the --

2 CHAIRMAN ZIEMER: More than 50  
3 percent is below the median --

4 DR. ANIGSTEIN: I know, but you have  
5 -- I'm talking from a dose standpoint, not from  
6 simple numbers. Equal amounts, you have the  
7 betas are over to -- again, the beta spectrum.  
8 But the cutoff is something like 4.25 MeV, where  
9 as the gammas are within the hundreds of keV  
10 range.

11 So you have -- yes, you have the  
12 actual dose rate. I know because we have to do  
13 separate MCNP ones to get the betas -- to get  
14 the -- to get the bremsstrahlung and to get the  
15 photons. One can see electrons as your source  
16 of emitting photons. And the doses are  
17 approximately equal -- so you do get, despite  
18 the fact the bremsstrahlung is low-energy, you  
19 get -- you still get enough high energy  
20 bremsstrahlung. Because even if it's a half or  
21 one-third of the maximum beta energy, you're  
22 still talking into the hundreds of keV.

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1                   So, I'm just saying that short of  
2                   doing a parametric study, which is all that can  
3                   be done, it can't be dismissed. It can't just  
4                   be simply said, "Well, it can't be more than  
5                   this on theoretical grounds."

6                   MR. THURBER: But the point though  
7                   that John was making is that regardless of the  
8                   specific model one uses, or the extent to which  
9                   photon exposure is enhanced at the surface  
10                  because of concentration of uranium daughter  
11                  products that the data in TBD-6000 are  
12                  sufficiently conservative to embrace that if you  
13                  use, as the basis of comparison, the maximum  
14                  photon dose observed at Fernald. I mean, that's  
15                  -- that's the bottom line.

16                  DR. ANIGSTEIN: I don't disagree  
17                  with that.

18                  CHAIRMAN ZIEMER: Because whatever  
19                  was observed has to include all the components.

20                  MR. THURBER: Exactly.

21                  CHAIRMAN ZIEMER: Bremsstrahlung  
22                  plus the inherent gammas.

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1 DR. MAURO: See, that's why I think  
2 the only reason we bring it up -- yes, yes.

3 CHAIRMAN ZIEMER: Because these  
4 observed numbers, they've got to be a composite  
5 of everything.

6 DR. MAURO: Exactly. So, in a way I  
7 feel funny bringing it up because I think the  
8 problem has been resolved, but we never really  
9 talked about this. And now that we're talking  
10 about it, it also rings true. And I think the  
11 TBD-6000 approach, using the Fernald data and  
12 the theoretical data, capture it, both beta and  
13 gamma. But it's good to get on the record that  
14 we explored this.

15 CHAIRMAN ZIEMER: Yes. I wonder if  
16 either Mark --

17 MR. KATZ: Dr. Poston is not  
18 expected. Mark, have you joined us? I'll send  
19 him an email too.

20 CHAIRMAN ZIEMER: Let me see if  
21 there's other comments or questions on this.

22 MR. THURBER: This is Bill Thurber.

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1 I had a question for NIOSH. I didn't quite  
2 understand the intention of the last two  
3 sentences in the write up, where it says, "A  
4 ratio of 10 will be used to account for the  
5 Puzier effect." I don't understand what that  
6 means, or -- or in practice, how that would be  
7 implemented.

8 MR. ALLEN: Well, essentially,  
9 that's how it's implemented in TBD-6000 now.  
10 The -- the photon dose is modeled in TBD-6000,  
11 and the skin dose is modeled as ten times that.

12 And I think I said several Work Group meetings  
13 before that the times 10 was not just a wild  
14 shot in the dark. That was from at least  
15 reviewing the number of dosimetry records from  
16 various sites that did have this recasting going  
17 on. And essentially, as John Mauro has pointed  
18 out, TBD-6000 does account for it by some  
19 conservative assumptions, and one of those  
20 really is that factor of 10 on the beta dose.

21 MR. THURBER: Oh, by that -- is that  
22 David?

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1 MR. ALLEN: Yes, it is.

2 MR. THURBER: Hi. I guess what  
3 you're referring to is the fact that you assume  
4 the beta dose is ten times the photon dose at  
5 one foot?

6 MR. ALLEN: Right.

7 MR. THURBER: And that that number  
8 came -- was somehow deduced from some other  
9 information?

10 MR. ALLEN: Right.

11 MR. THURBER: And a point that we  
12 made at the time was that it was not very clear  
13 how it was deduced, but it seems to me that it  
14 would be better to say here that the -- just  
15 what we've been saying is that the Puzier effect  
16 is embraced by the numbers in TBD-6000.

17 I mean to me, reading this factor of  
18 10 only confuses me, rather than clarifies the  
19 issue for me. But that's perhaps my personal  
20 bias.

21 CHAIRMAN ZIEMER: Keep in mind,  
22 Bill, that originally one of the reasons for

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1 adding this discussion was the fact that it  
2 wasn't clear -- it wasn't clear why they were  
3 using the factor of 10 to start with. It had  
4 been in use. I believe it was the practice.

5 So, what was the context? This was  
6 intended to clarify that discussion.

7 MR. ALLEN: Well, this whole  
8 discussion was intended to discuss the Puzier  
9 effect, and --

10 CHAIRMAN ZIEMER: Right, and show  
11 that the 10 still embraced what you see in  
12 practice.

13 MR. ALLEN: Yes. In reality,  
14 originally, even though it wasn't stated in TBD-  
15 6000 that the 10 was to account for the Puzier  
16 effect, but it was never discussed in TBD-6000.

17 So, the intent of this write up was to discuss  
18 it, and say essentially that's 10. It is a  
19 write up. I'm open to comments, and  
20 suggestions, et cetera on this.

21 MEMBER BEACH: I have another  
22 question. On the first page, second paragraph,

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1 last sentence, it says, "The ratios were  
2 calculated and added. Here, the hands and whole  
3 body ratio is not used, but it's instructive to  
4 review these as well."

5 How -- how is the reviewer to know,  
6 or where is that located? The instructive part  
7 just kind of threw me a little.

8 MR. ALLEN: I'm not sure I'm getting  
9 the question, Josie. I'm sorry.

10 MEMBER BEACH: The last sentence  
11 basically says that this table is not going to  
12 be in TBD-6000.

13 MR. ALLEN: Right.

14 MEMBER BEACH: But it's instructive  
15 to review these as well? I guess I'm looking  
16 for clarification of what that means.

17 MR. ALLEN: This whole first piece  
18 here was just to provide some background as to  
19 why we're posing this language for TBD-6000.  
20 It's just to help clarify things, which it  
21 failed miserably.

22 MEMBER BEACH: Okay, so, the,

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1 "instructive to review these as well?" What's  
2 that for?

3 MR. ALLEN: The ratios is what  
4 you've never seen before.

5 MEMBER BEACH: Right, okay. So,  
6 it's just -- so it's not for --

7 MR. KATZ: Not for the dose  
8 reconstruction.

9 MEMBER BEACH: That's what -- see, I  
10 was just looking at like that the dose  
11 reconstructor would go look for that. So,  
12 that's -- thank you for clarifying that. That's  
13 what I thought.

14 CHAIRMAN ZIEMER: Other questions or  
15 comments? I'm not hearing any recommendations  
16 for revising this. Seems to me it's fairly  
17 clear, and provides a basis for which the ratio  
18 was used.

19 MEMBER MUNN: I would think that  
20 John's point is well taken that it helps get the  
21 discussion on the record, although it appears to  
22 me that the key phrase in the entire discussion

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1 was Bob's phrase, "In theory." We don't have  
2 any actual evidence that would cause this to  
3 change.

4 CHAIRMAN ZIEMER: No, no. In fact -  
5 - in fact, the practical information is in the  
6 table.

7 MEMBER MUNN: Yes, yes.

8 CHAIRMAN ZIEMER: I mean, actual  
9 readings take precedence over theoretical  
10 models.

11 MEMBER MUNN: Agreed, agreed.

12 CHAIRMAN ZIEMER: I'm going to take  
13 it by consent, and we'll have Mark and John  
14 weigh in on this, but at the moment that we  
15 agree that this should be added to the -- to the  
16 document as part of the revision.

17 Now, I want to just momentarily pull  
18 out the matrix now, the TBD-6000 matrix, which  
19 is on your list there. This is the October --  
20 what's the date on it? October 7th document,  
21 SEC Issues Resolution Matrix TBD-6000.

22 Okay, so the first page here, the

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1 very last item comes out of the May 12th  
2 meeting. It says, "NIOSH provided" -- well,  
3 development since May 12th. "NIOSH provided a  
4 White Paper documenting proposed language to be  
5 used in TBD- 6000 on the Puzier effect,  
6 reference Allen 2010, which is to be included  
7 here as an attachment." Here as an attachment?

8 DR. MAURO: It's in the back of  
9 that.

10 CHAIRMAN ZIEMER: Oh, got you.  
11 Included in the matrix. But the point is then  
12 that would -- if we agree, that will -- the  
13 final action will be that we'll accept that to  
14 close this item. Again we need to get input  
15 from the other two members, but -- we'll have to  
16 get a status.

17 Okay, let's -- you'll notice on page  
18 2 on the second, "Issue 2 remains in abeyance  
19 pending revision." And the revision: look at  
20 October 14th. NIOSH agreed to include a table  
21 addressing external exposures to beta associated  
22 with contaminated surfaces.

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1                   We agreed on that before, but  
2                   basically the item is taken care of, and this  
3                   would appear in the revision, as would the first  
4                   one. Issue 3, closed.

5                   DR. MAURO: Is that the thorium one?  
6                   That was the thorium. Question was why is  
7                   thorium there?

8                   MR. ALLEN: Right.

9                   DR. MAURO: It answered it, and as  
10                  far as they're concerned --

11                  CHAIRMAN ZIEMER: That is closed.  
12                  That was closed previously. Issue 4: we  
13                  resolved that at the May 12th meeting. That was  
14                  airborne uranium dust concentrations.

15                  Issue 5, bottom of page 4. This  
16                  issue has been closed previously. So, that is  
17                  the method used to derive surface contamination  
18                  and external dose. That was closed previously.

19                  DR. MAURO: That was when the Adley  
20                  Report came up.

21                  CHAIRMAN ZIEMER: Adley Report,  
22                  right.

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1 DR. MAURO: Everything's fine.

2 CHAIRMAN ZIEMER: Issue 6:  
3 transferred to the Procedures Working Group.

4 DR. MAURO: Resuspension factor?

5 CHAIRMAN ZIEMER: Suspension factor,  
6 which is a system-wide concern. So, that moves  
7 out of this document. Doesn't mean the answer  
8 is there, but it won't be addressed in this  
9 document.

10 It's not clear to me, though, in a  
11 revision what -- how would that be handled in  
12 the revision? You would refer to what -- to  
13 whatever document is going to discuss that.

14 MR. ALLEN: Yes, well, there's  
15 numbers in the revision. There's numbers in  
16 TBD-6000. So, they -- I mean if that number  
17 were to change in the future, it'd require  
18 revision of quite a few documents. It's pretty  
19 much a complex-wide issue.

20 CHAIRMAN ZIEMER: But I'm thinking  
21 let's say that you're ready to revise that. And  
22 this issue is still open somewhere else. I mean

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1 do you -- in my mind, you shouldn't have to wait  
2 until it's closed somewhere else. You just say  
3 that you're going to use the resuspension factor  
4 that's determined in whatever document is  
5 addressing that. Do we know where that's going  
6 to be?

7 DR. MAURO: It would be in TIB-9.  
8 It would be in OTIB-70. It would be in several  
9 places.

10 DR. NETON: TIB-9 is referenced in  
11 most of these other documents, and that's the  
12 basis for --

13 CHAIRMAN ZIEMER: Do you recall now  
14 if there's actual values in TBD-6000?

15 MR. ALLEN: Yes, it does, because it  
16 had to calculate various exposures based on the  
17 resuspension factor. So, in the future, yes, it  
18 would require revision. But no, it's not going  
19 to wait for --

20 CHAIRMAN ZIEMER: You'll wait for  
21 that one?

22 MR. ALLEN: Right. Unless it looks

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1 like it's close to being resolved, we'll move  
2 ahead with TBD-6000 revision.

3 MR. THURBER: Will the TBD-6000  
4 revision reflect that that parameter is under  
5 review?

6 MR. ALLEN: No. We usually don't  
7 reflect in our documents anything that's under  
8 review.

9 CHAIRMAN ZIEMER: Well, let me ask  
10 it a different way. Can you nonetheless  
11 indicate that there is a document, TBD whatever  
12 it is, -- TIB-9. Or, do you already refer to  
13 TIB-9?

14 MR. ALLEN: I think it's TIB-70.

15 MEMBER MUNN: Procedures says 70 on  
16 the list for tomorrow.

17 DR. MAURO: Could I say something?  
18 Because this is more protocol, and how do you  
19 get through the day? In other words, we have in  
20 many places issues that are open. But  
21 nevertheless, NIOSH continues to do DR reviews,  
22 and goes -- so it's not that -- so, let's say

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1 we're talking about a case that's being  
2 reviewed, and they're going to -- you're going  
3 to need to draw upon this OTIB-6000 -- TIB-6000.

4 I suspect that you're going to  
5 continue to use that approach until it's shown  
6 that that has to be fixed, and then the PER  
7 comes out. But you're not going to be in  
8 abeyance your ability to dose reconstructions  
9 while you're waiting for that to be resolved.  
10 So, I don't see words going in there like that.

11 I think you stick with this.

12 CHAIRMAN ZIEMER: The only thing I  
13 was asking for was can we reference that we're  
14 using resuspension factors based on -- I mean is  
15 there a current --

16 MR. ALLEN: I don't recall what the  
17 current language is.

18 DR. NETON: If it doesn't reference  
19 TIB-70, it should then. We should go back and  
20 say the basis for this is TIB-70. That would  
21 ensure that we went back and --

22 DR. MAURO: The link is there.

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1 DR. NETON: Because that's an easy  
2 fix to go through and find all documents that  
3 have references to TIB-70. I agree with that.

4 MR. THURBER: In just glancing at  
5 TBD-6000, I -- the first hit I came up with for  
6 the resuspension factor of 10 to the minus 6 was  
7 NRC 2002 B.

8 MR. ALLEN: Yes, that's what I was  
9 thinking. I think TBD-6000 was written before  
10 TIB-70.

11 CHAIRMAN ZIEMER: Well, but I think  
12 we need to change the reference.

13 MR. THURBER: But that is the  
14 current reference in TBD-6000, which is that  
15 reevaluation of indoor resuspension factor for  
16 screening analysis of building occupancy  
17 scenario for NRC's license termination rule.

18 DR. MAURO: Interesting. See, now  
19 you're referencing some source document, and we  
20 did have some discussion why we felt that  
21 particular citation really wasn't applicable,  
22 because that was to clean buildings. So, in a

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1 strange way, you don't currently have the link.

2 I guess that's what I'm saying.

3 CHAIRMAN ZIEMER: I think for the  
4 revision, you can link it to your own document.

5 That would be the way to do it. So, let's --  
6 let's agree that --

7 MR. ALLEN: Yes.

8 DR. NETON: That's an easy fix.

9 CHAIRMAN ZIEMER: That way, it is  
10 transferred so we have the link that way. That  
11 way, we can proceed with whatever revisions.  
12 Okay, then on page 6, which is issue 7, it says,  
13 "This is a TIB-0009 issue, and accordingly  
14 outside the scope of the Work Group."

15 I wrote a note to myself. Did we  
16 actually transfer that, or did we need to  
17 transfer that? I mean well, actually, we don't  
18 transfer that since it's all -- TIB-9 is already  
19 there. So, this is a similar situation.

20 MR. ALLEN: Yes, in this case, TIB-  
21 6000 does reference TIB-9.

22 CHAIRMAN ZIEMER: Okay, so the

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1 reference is already there.

2 MR. ALLEN: Yes.

3 CHAIRMAN ZIEMER: Okay, notice the  
4 initial finding. NIOSH -- let's see. I'm  
5 looking for the NIOSH response. "NIOSH  
6 methodologies are subject to numerous reviews  
7 and has been taken up as an overarching issue.  
8 If the methodologies change, the change will be  
9 incorporated."

10 So, it already says that they are  
11 looking at it. So, I think we're all right  
12 then. You already made a reference, and we don't  
13 have to resolve it here per se. It would be --  
14 we continue as it is until it's resolved  
15 overarching. Everybody understand that? Okay.

16 That -- that's the last issue. So,  
17 pending a confirmation of our other two Work  
18 Group members on the first one, I would like to  
19 be in a position to say that we are ready for  
20 NIOSH to proceed with the revision.

21 I think, based on Stuart Hinnefeld's  
22 note to Dr. McKeel, and I think he was

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1 specifically talking about Appendix BB, but I  
2 think the principle that Stuart Hinnefeld was  
3 indicating was that, insofar as possible, the  
4 revisions would not be piecemeal. That is,  
5 "Okay, we've closed issue one. We revise." And  
6 then three months later, we close issue two and  
7 we're going to revise again, or something like  
8 that.

9 He wanted us to be in a position to  
10 say, "Okay, we've got all the issues now. We'll  
11 revise the document. And I think, Dave, we're  
12 at that point now, I believe.

13 MR. ALLEN: I believe so. I don't  
14 think you actually said it, but I guess issue  
15 one is in abeyance officially.

16 CHAIRMAN ZIEMER: Well, I think  
17 issue one -- I'm taking it by sort of consent  
18 here that we're ready to close this, but I want  
19 to give Mark or John an opportunity to make any  
20 comments they have on that.

21 MR. KATZ: Mechanically, how do you  
22 want to do that? Do you want to send them a

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1 memo, an email, summarizing this conversation?  
2 I don't know how long you want this to be held  
3 hostage? Until another Work Group meeting or  
4 whatever? You don't really want to do that, do  
5 you? It seems like --

6 CHAIRMAN ZIEMER: No, I don't want  
7 to do that. I'm just saying that I'd like them  
8 to have the opportunity to comment on this. If  
9 they have major concerns, give them the  
10 opportunity to raise that. If they don't have  
11 major concerns, I'd consider we'd resolved that.

12 MR. KATZ: Do you want me to send  
13 them a memo about this, following this meeting  
14 is what I'm saying. How do we get a response  
15 out of them?

16 CHAIRMAN ZIEMER: I think that would  
17 be good.

18 MR. KATZ: Okay.

19 CHAIRMAN ZIEMER: In order to --  
20 that's the only thing they would have to give us  
21 input on. In order to complete the resolution  
22 of all issues on TBD-6000, we would like their

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1 input on the proposed wording for dealing with  
2 the Puzier effect. Because as set forth in the  
3 NIOSH paper --

4 MR. KATZ: Right.

5 MEMBER BEACH: Attachment 8 of the  
6 matrix?

7 CHAIRMAN ZIEMER: Yes, right. That  
8 was attached, wasn't it?

9 MEMBER BEACH: Yes.

10 MR. KATZ: That's a White Paper,  
11 right?

12 CHAIRMAN ZIEMER: Right. That was  
13 also distributed.

14 MR. KATZ: So, I will send them an  
15 email summarizing what happened here, and ask  
16 for their input on that.

17 CHAIRMAN ZIEMER: Okay, very good.  
18 And then Dave, under item 3C, I just -- I put  
19 summary of revisions to be made, and I think we  
20 know what they are. They're inserting this  
21 proposed wording on the -- on issue 1. It would  
22 include referencing -- is it TIB-70 for issue 6?

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1 I guess those are the only two things that  
2 would need --

3 MR. ALLEN: Issue 2, some beta dose  
4 recalculation for surface contamination, the  
5 TIB-70 was part of issue 6, I believe.

6 CHAIRMAN ZIEMER: Right. Oh, issue 2  
7 -- issue 2 remains in abeyance pending revision.  
8 That's right, you have an insert there. We've  
9 agreed on what you're going to put in there.

10 MEMBER MUNN: Yes.

11 MR. ALLEN: Right, and if I recall  
12 right, we didn't account for the beta dose from  
13 surface contamination. SC&A calculates numbers  
14 in their review, and we haven't calculated any  
15 numbers, but I believe we're going to be pretty  
16 similar.

17 DR. MAURO: We calculated numbers --  
18 Bob calculated the numbers -- simply to show  
19 that you can't just dismiss it as being not --  
20 not --

21 CHAIRMAN ZIEMER: Well, remind us of  
22 what's going to go in, though. Are you going to

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1 put something in there?

2 MR. ALLEN: Yes, right now it's  
3 absent from surface contamination, the beta  
4 dose. We are going to calculate that and add it  
5 in. That's why it's in abeyance until the  
6 revision.

7 CHAIRMAN ZIEMER: Okay, so, there's  
8 three things that have to appear.

9 DR. MAURO: I hate to bring it up,  
10 but the issue of, let's say, the resuspension  
11 factors, classic example. Now, does that mean  
12 in here it's in abeyance because it's waiting  
13 for it to resolved some place else? I'm not  
14 quite sure. Or, is it closed here because it's  
15 presumed that eventually it will be cleared up  
16 somewhere else?

17 MR. ALLEN: It was transferred out  
18 of --

19 DR. MAURO: Oh, then it's  
20 transferred out. So, in abeyance would be that  
21 you still have to make a revision to this  
22 procedure. Transferred means --

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1                   CHAIRMAN ZIEMER:    The in abeyance  
2                   part is we've agreed on a solution, but they  
3                   haven't put it in the document yet.

4                   DR. MAURO:           That's never been  
5                   transferred. Okay.

6                   CHAIRMAN ZIEMER:    So, there's three  
7                   things that are going to show up in this  
8                   revision, and the question here is, are you in a  
9                   position to give us the time table? This is not  
10                  a raise your right hand and affirm that you will  
11                  have this.

12                  (Laughter.)

13                  CHAIRMAN ZIEMER: But give us some  
14                  idea.

15                  MR. ALLEN:    I was trying to look at  
16                  that last night, and I am going to have to try  
17                  to commandeer a bunch of resources because I've  
18                  got things promised to other Work Groups, et  
19                  cetera, that have got me swamped at this point.

20                  On my own, it's going to be a number  
21                  of months before this happens. I'm hoping to  
22                  get some resources, some help for that that can

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1 narrow that time frame.

2 CHAIRMAN ZIEMER: Now, you are  
3 already using these -- for example, the factor  
4 of 10. I mean, the fact that it doesn't show up  
5 there doesn't affect how this is being used.

6 MR. ALLEN: Correct.

7 CHAIRMAN ZIEMER: And the same is  
8 true of everything else in here?

9 MR. ALLEN: Except that beta dose  
10 for issue 2.

11 CHAIRMAN ZIEMER: Right, right. Is  
12 that affecting how you're doing any dose  
13 reconstruction?

14 MR. ALLEN: It will change some  
15 numbers. I think everybody agreed it's a small  
16 magnitude during operational periods at least.  
17 It's, like I said, the beta dose from the  
18 surface contamination, not from the metal, et  
19 cetera.

20 CHAIRMAN ZIEMER: Right. So, right  
21 now, if a dose reconstructor does a dose  
22 reconstruction based on TBD-6000, it might be

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1 slightly different than it would be once the  
2 revision occurs.

3 MR. ALLEN: Yes, but we've been in  
4 that position for quite a while. And like you  
5 mentioned before, we don't want to piecemeal  
6 this.

7 CHAIRMAN ZIEMER: Yes, I understand.  
8 I understand.

9 MR. ALLEN: We really need to --

10 CHAIRMAN ZIEMER: If it's a small  
11 effect, it may not be critical. It's a little  
12 more problematical when you get to Appendix BB,  
13 where -- particularly on the length of the work  
14 week issue because the work goes from 40 hours  
15 to 65, which I think it was 65. My  
16 understanding is that dose reconstructors are  
17 still not using that number. It's not been  
18 accepted. Is that correct?

19 MR. ALLEN: Right, because there's a  
20 number of other big ticket issues that were not  
21 resolved.

22 CHAIRMAN ZIEMER: Well, we'll

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1 discuss that in a little bit. But anyway, okay,  
2 so, you're not sure of the time table, but I  
3 mean --

4 MR. ALLEN: It's not going to be  
5 soon.

6 CHAIRMAN ZIEMER: It's not going to  
7 be in the next month or two. But it's got to be  
8 in the queue somewhere.

9 MR. ALLEN: Yes. It's in the queue  
10 behind the appendices for TBD-6001 right now,  
11 assuming that we don't have any major  
12 disagreement on issue 1 with the other Board  
13 Members.

14 CHAIRMAN ZIEMER: Right, right.

15 MR. ALLEN: But there's definitely  
16 time for them to comment on it before we start -  
17 -

18 CHAIRMAN ZIEMER: Right, right.  
19 Okay, good. Let's proceed with Appendix BB,  
20 General Steel Industries Issues Matrix.  
21 Actually, I may want to change this around a  
22 little bit. Let me point out several things

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1 here.

2 We have the SC&A White Paper on  
3 review of NIOSH paper on portable radiography  
4 sources, and I don't have a good feel on --  
5 because Dave, you have a Path Forward paper that  
6 becomes important here in terms of linking your  
7 previous White Paper, the SC&A review, and  
8 what's going to happen in the future.

9 I think, as I thought about it, it  
10 seemed to be that maybe some of the detail would  
11 change on how you're going to go about it. In  
12 different populations, the source terms may  
13 change. But some of the other stuff may remain  
14 the same in terms of how you go about it.  
15 Numbers may change on occupant, time spent at  
16 different locations. We have some additional  
17 source terms you're looking at, how you're going  
18 to put them together.

19 But my question is, is it profitable  
20 for us to go into the SC&A draft in detail right  
21 now? Are they going to have to come up with a  
22 revised document based on your revised document?

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1 I don't want to sit here and resolve a bunch of  
2 issues that are going to not be useful.

3 MR. ALLEN: That's kind of why I put  
4 that together is to try to put it all in one  
5 place.

6 CHAIRMAN ZIEMER: Yes, yes.

7 MR. ALLEN: Because we've gotten so  
8 much more information since the Appendix was --

9 CHAIRMAN ZIEMER: Well, what we may  
10 want to do is -- is sort of turn this around  
11 because actually at the time when I first  
12 drafted this, I didn't have your Path Forward  
13 thing in hand, and as I -- once I looked at the  
14 Path Forward thing in detail, I thought, you  
15 know, we may want to use that as a framework and  
16 say okay, what of these earlier things should we  
17 look at now, and what can we wait on?

18 Let's skip item issue 1, subset 1  
19 for the moment, which is the SC&A paper. Let me  
20 just move ahead for a moment. Item 2 is  
21 consideration of additional radiography X-ray  
22 sources identified through auction records.

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1           I just put that in here because I  
2           just wanted to make sure that that's in -- we  
3           have that information, Dr. McKeel is able to  
4           find those auction records, and NIOSH now has  
5           that. You have included and identified those in  
6           your Path Forward. So, those are in the  
7           consideration now.

8           The betatron induced air activity as  
9           a source-term, I do want us to look at that  
10          because you will be looking at that, and SC&A  
11          has had, I think, an early look at it.  
12          Regardless of how things were put together, at  
13          some point, we're going to have to look at that  
14          as an entity. How important is the induction of  
15          air activity? So we do want to look at that.

16          And then issues 3 to 11 impacted new  
17          issue 1 information, which is your Path Forward  
18          on these issues. So, your Path Forward also  
19          overlaps into the petition review as well.

20                   MR. ALLEN: Yes.

21                   CHAIRMAN ZIEMER: So, what I'm sort  
22          of thinking about now is maybe it would be

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1 useful for us to use the Path Forward document,  
2 and start looking at those items, and say okay,  
3 how is this going to be done?

4 Then for example, you don't give  
5 solutions to those. You say, mostly, what  
6 you're planning to do. Then I think we can go  
7 to -- go to your White Paper, and say well,  
8 here's how you've done it before, and here's the  
9 concerns on how you're approaching that.

10 Do you think we could do it that  
11 way? It's a little bit different way of looking  
12 at this, but I don't see the point of spending a  
13 lot of time on some details, which could change.

14 John what do you think?

15 DR. MAURO: Yes, I agree completely  
16 because things like, how many seconds would it  
17 take for a guy to -- there's so many questions  
18 on what's the right number to use. But in my  
19 mind, these are all tractable problems. It's a  
20 matter of how to come to reasonable agreement  
21 amongst ourselves. How far? How strong is the  
22 source? When is the source -- questions like --

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1 and we can certainly do that in the process you  
2 described.

3 I'm more concerned about those  
4 pieces of information that we're lacking that  
5 put us in a position that result in the  
6 difficulty in reconstructing the dose. I think  
7 we as health physicists, we should probably come  
8 to consensus on what the optimal assumption  
9 should be for a given scenario.

10 CHAIRMAN ZIEMER: Yes.

11 DR. MAURO: But I think that the  
12 areas that are really -- we could always get to  
13 that on the Site Profile issues. But I think  
14 the Work Group primarily right now is interested  
15 in what are the -- where are the places where  
16 we're lacking data that really undermines the  
17 ability to do dose reconstructions? And I think  
18 that's the important distinction there, at least  
19 that I have in my mind.

20 CHAIRMAN ZIEMER: Other Board  
21 Members, what's your feeling on how to proceed  
22 here?

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1                   MEMBER MUNN:    I think I agree with  
2     John.

3                   CHAIRMAN ZIEMER:   We set up this  
4     agenda over a week ago, and then it looks like -  
5     -

6                   MEMBER MUNN:    The Path Forward --

7                   CHAIRMAN ZIEMER:    Yes, the Path  
8     Forward thing.    I think it changes how I'm  
9     thinking about it.

10                  MEMBER MUNN:    Well, it certainly  
11     helped clarify things for me, even though almost  
12     everything in here is something we passed over  
13     pretty thoroughly one way or another, to have it  
14     all compressed in one document and here in front  
15     of us to look at was most helpful.

16                  I think we're in pretty good shape.  
17     I mean unless -- I would like for our  
18     discussion here to be whether or not there are  
19     major holes in overlooking that.    Other than  
20     that --

21                  CHAIRMAN ZIEMER:    I think that is  
22     what John was suggesting too.    Josie, do you

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1 have any comments?

2 MEMBER BEACH: Believe it or not, I  
3 agree with Wanda. Now that I think about it,  
4 that was a nice to look at that and see it all  
5 compressed in one document. I agree.

6 CHAIRMAN ZIEMER: Okay, well, with  
7 that as a background -- actually, I'm trying to  
8 remember. I guess I'll just look at the  
9 document. What did you say about air activity  
10 in your Path Forward thing, David?

11 MR. ALLEN: That was one that I  
12 expanded out a little bit and discussed --

13 MEMBER MUNN: It's on page 5.

14 CHAIRMAN ZIEMER: Oh, okay. Yes.  
15 Okay --

16 MR. ALLEN: You want me to give a  
17 little --

18 CHAIRMAN ZIEMER: We can pick it up  
19 when we get there, because I have some questions  
20 on that, and I know SC&A does. But maybe the  
21 way to do that is, we'll go through the  
22 document, and then take these as they come.

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1 That will keep it in order.

2 MEMBER MUNN: I didn't even say, for  
3 a change.

4 CHAIRMAN ZIEMER: Okay, I'm using  
5 them as a framework to address other issues on  
6 the agenda, the Path Forward document that Dave  
7 developed. The first page just gives some  
8 background information, some exposure  
9 scenarios. And I don't know that this is  
10 intended to be an exhaustive list, but you're  
11 giving examples of the kind of things that you  
12 would expect to consider.

13 I suppose that if there's some  
14 glaring error, not an error but something  
15 glaringly missing, why, we need to identify  
16 that. That's not intended necessarily to be the  
17 exhaustive list. This is the type of thing  
18 you're -- the way you're going to look at these  
19 things.

20 MR. ALLEN: Correct. It was not  
21 intended to be an exhaustive list of all the  
22 exposure scenarios.

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1                   CHAIRMAN ZIEMER:     Right.     And you  
2     identify some additional data that you have  
3     obtained since you last did your evaluation of  
4     this.     And then on the second page, you have the  
5     sort of statement about applying these things to  
6     modeling exposures.

7                   You talk about the film badges, the  
8     surveys, the 80 curie sources, and some other  
9     sort of, well --

10                  MR. ALLEN:     Basically, it's some  
11     fundamental concepts.

12                  CHAIRMAN     ZIEMER:            Fundamental  
13     concepts.     Yes, you can't have multiple sources  
14     out doing radiographs simultaneously, at least  
15     not in close proximity.     I suppose you could in  
16     extreme areas of the building.     But in any event  
17     --

18                  MR. ALLEN:     The idea behind that was  
19     to say that we have, through various sources,  
20     have collected so much data since the Appendix  
21     was written that data we have really all needs  
22     to reconcile with each other.     You can't have an

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1 exposure model that throws out some data unless  
2 you say it's untrustworthy data somehow.

3 So I think it is possible to  
4 reconcile all that data, and it kind of zeroes  
5 you in on some pretty close exposure models,  
6 where there's not as much uncertainty as there  
7 was originally.

8 MEMBER MUNN: I guess at this point  
9 I would have one question and only one question,  
10 and that is, although you said it wasn't going  
11 to be extensive and totally explicit, it seemed  
12 to me that all of the major items, which had  
13 been brought up for discussion at one time or  
14 another, were pretty well listed here in Dave's  
15 paper. And if there are -- if there are major  
16 issues that would affect to any significant  
17 degree the work that is going forward with this  
18 particular facility, this betatron facility. At  
19 this juncture, I'd like to hear from SC&A or  
20 anyone else if there are outstanding issues that  
21 are of major concern to them that haven't been  
22 touched on here.

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1                   CHAIRMAN ZIEMER: Well, I do want to  
2 ask a question on the -- on the dates, because  
3 there has been some sort of discussion on the  
4 start dates for the cobalt sources. Has that,  
5 in your mind, been resolved, Dave? I mean, the  
6 start of the license period versus some  
7 testimony by workers that those cobalt sources  
8 may have been present a few years earlier shows  
9 up in that NRC/AEC license.

10                   MR. ALLEN: I don't remember if it  
11 is, as far as earlier than '62 cobalt, whether  
12 workers had any. I don't know if they were that  
13 exact on the dates.

14                   DR. MCKEEL: This is Dan McKeel.  
15 Can I speak?

16                   CHAIRMAN ZIEMER: Sure, yes, Dan.  
17 Please, because I know you've looked at this.

18                   DR. MCKEEL: Okay. Well, on this, I  
19 have to say that the whole paper, and  
20 particularly addressing Wanda Munn's question, I  
21 read this document this morning very quickly.  
22 And my impression is that I need to offer a

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1 challenge to many of the facts in that there are  
2 many things left out of this list that need to  
3 be addressed.

4 This is actually an excellent  
5 example. It's not just that there's been a  
6 little bit of mention of the cobalt-60 80 curie  
7 source at GSI prior to 1968, when the AEC  
8 license information indicates it was first  
9 there. And I would like to put on the record  
10 that the NRC FOIA that's mentioned in this paper  
11 and in several other White Papers seems to --  
12 the indication is that it appeared suddenly on  
13 the NRC website, which it did not.

14 So, you know, not only did I get  
15 that information, but I put a detailed annotated  
16 critique of the 37 items in that packet, and put  
17 that up on the public docket, and it's been  
18 there for several months.

19 As far as the large cobalt-60 80  
20 curie source, Terri Dutko, who I'm sure his name  
21 will be edited out of the transcript, but you  
22 all know this very well. He wrote several

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1 explanatory emails to the Work Group and the  
2 Board, explaining that -- and sent affidavits,  
3 additional affidavits from five or six other  
4 workers there, that said that they personally  
5 used the large source in '64 and '65.

6 And so, you know, when -- if Allen  
7 says -- just dismisses the 80 curie cobalt-60  
8 source, and says it's not covered under EEOICPA,  
9 that's a very incomplete statement. And as you  
10 all well know, one of the extreme concerns of  
11 workers all over the country about the way this  
12 act is being administered and overseen by the  
13 Board is that, routinely, worker testimony is  
14 placed second beneath written documents.

15 And so, yes, it's true that there is  
16 a document saying that the 80 curie source was  
17 licensed in 1968 at the GSI Illinois location.  
18 However, there's additional information that was  
19 followed up by both Dr. Anigstein and myself to  
20 obtain the information on the large 80 curie  
21 source used at Eddystone, Pennsylvania, which as  
22 everybody knows by now moved lock, stock and

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1 barrel to GSI in Illinois in 1963.

2 So, I guess what the Work Group has  
3 to consider is, is it willing to accept NIOSH's  
4 dismissal of all that affidavit testimony? And  
5 I just want the record to show that there is a  
6 strong set of on the record affidavits from GSI  
7 workers who said that they themselves -- this is  
8 not secondary information. This is eye-witness,  
9 hands-on, "I used an 80 curie source," from  
10 people who left the site in 1966.

11 So, I just want to put that on  
12 record. I think the record should reflect that  
13 certainly the licensing information from the AEC  
14 does show '68, but there's other information  
15 that there was in use an 80 curie source earlier  
16 than that, including one, and this is a factual  
17 error in this paper, that St. Louis Testing used  
18 an 80 curie source outside, and that at some  
19 point, I don't remember the date of the letter,  
20 that GSI Illinois applied to the Illinois  
21 Department of Health to move a cobalt-60 source,  
22 80 curie one now, 80 curie, out of the betatron

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1 building, and to use it inside, and Illinois  
2 Department of Health denied that.

3 That's also in that NRC material.  
4 So I just want to put it on the record. This is  
5 one thing I -- I absolutely got overwhelmed. I  
6 started to write my comments to make this paper,  
7 and I realized that it would take me 30 pages,  
8 which I will do promptly after this meeting  
9 ends.

10 But I guess maybe this might be my  
11 last opportunity to comment, but I just want to  
12 comment that I think there's so many factual  
13 mistakes in this document and that if you read  
14 the document, I don't mean item by item, but  
15 actually, I did read the document item by item.

16 And it proposed in here, NIOSH essentially  
17 admits, that much of the work it has already  
18 done is not valid, and that it needs to be  
19 redone from scratch.

20 And I'll give you one other example,  
21 and then I will end or close for this moment.  
22 There's a comment in there about neutron doses.

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1       And I'm sure this Work Group remembers that I  
2       pointed out that NIOSH said that they had  
3       neutron doses for GSI in their SEC Evaluation  
4       Report, based on photon to neutron doses on page  
5       30.

6                       We made extensive inquiries about  
7       that, asking NIOSH to please produce that data.

8       And what I received was an illusion that SC&A  
9       had made those calculations. SC&A then reviewed  
10      the SEC Evaluation Report and essentially said  
11      that NIOSH had not provided neutron data, and  
12      here in this Path Forward paper, NIOSH says, oh,  
13      okay, all of that, you know, basically, we're  
14      going to now calculate neutron doses at GSI.

15                      And my comment is that if NIOSH  
16      began today, and I cannot understand why they  
17      haven't been working on most of this for the  
18      last two years, but if they started today, it  
19      would be five years at the current rate before  
20      they could possibly do all of this work.

21                      And I am saying that this document,  
22      this whole document, is an admission by NIOSH

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1 that they cannot at this moment, after two-and-  
2 a-half years of work, actually mid-2007 for the  
3 Appendix BB, that they are unable to accurately  
4 calculate doses. They've had -- they have not  
5 found this data that we've given to them, and  
6 there's even more data in here.

7 Left out of the first page list was,  
8 in the new data, was the 65-hour work week.  
9 That wasn't mentioned by Mr. Allen for some  
10 strange reason.

11 So, yes, there are major things that  
12 need to be put in Appendix BB. And all these  
13 methods, if you'll notice, are new methods to be  
14 worked out. So, I believe that the moral, the  
15 ethical, the scientific, the good science that  
16 everybody says they are intent on practicing,  
17 demands that the Work Group today decide that  
18 this is -- you know, as Wanda Munn has said  
19 repeatedly, there has to be a time to call a  
20 stop, and the time to call a stop is today.

21 NIOSH cannot accurately reconstruct  
22 doses. When we talk about the X-ray machines,

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1 the portable X-ray machines, left out of this  
2 paper is the fact that there were three portable  
3 X-ray machines at GSI: two industrial ones, one  
4 in the infirmary.

5 And it is very well-known, even by  
6 people like myself, that the industrial X-ray  
7 units were not shielded the same way as medical  
8 X-ray units. So when Mr. Allen says that the  
9 portable X-ray machines shot out a defined beam  
10 and wouldn't be expected to affect other workers  
11 in the area, that's absolutely ridiculous from a  
12 scientific point of view, and I know that, and  
13 you all all know that as well.

14 Those machines have not been  
15 characterized at all as to where they were used,  
16 who used them, how they used them. And how can  
17 you possibly say that you can accurately model  
18 just that one source alone?

19 So, my bottom line is, I am  
20 requesting that this group go through all their  
21 deliberations today, but at the end, I think the  
22 Board, this Work Group, needs to make a

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1 recommendation to the full Board to overturn  
2 NIOSH's recommendation to deny SEC-105, and to  
3 move forward on recommending to the full Board  
4 that it approve SEC-105.

5 And I can promise you that I am  
6 going to spend the last few months that I have  
7 as petitioner on this thing to reinforce the  
8 record on these points. And I very much  
9 appreciate you all listening, but I really think  
10 it's time for action. And I will be listening  
11 intently, and will be happy to comment on  
12 anything else. Thank you very much.

13 CHAIRMAN ZIEMER: Okay, thanks, Dan.

14 I understand your concerns here. I want to  
15 make a couple of comments and ask a couple  
16 questions on that -- on the -- well, comment  
17 one, the 66-hour work week. I believe we've  
18 already accepted that, but the problem is what I  
19 mentioned earlier. It's not in the revision  
20 yet.

21 So it doesn't actually get used, but  
22 I don't think there's any question that that

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1 will be in the revision is my understanding.  
2 Because it's been agreed to by us before.

3 DR. MCKEEL: Yes, but this paper  
4 doesn't say that.

5 CHAIRMAN ZIEMER: Well, it's not an  
6 issue that we're trying to --

7 DR. MCKEEL: Okay.

8 CHAIRMAN ZIEMER: That part is  
9 closed. Then on the -- let me make a remark on  
10 the X-ray, the radiography units. This is a  
11 general comment, because you were concerned  
12 about collimation.

13 I'll just mention to you and to the  
14 group, that without collimation, the success of  
15 an X-ray of this type is very bad because of  
16 scatter. If you do not collimate the beam and  
17 it's scattering off all the surroundings, you  
18 get a very poor radiograph.

19 So, I would -- I understand that  
20 certainly in the medical field in those days,  
21 doctors didn't collimate very well because they  
22 wanted to make sure they hit the X-ray film, and

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1 they had similar problems. They screwed up  
2 their own films by not collimating, and that  
3 could've happened here.

4 But a good radiograph seeks to  
5 collimate in order to minimize scatter, which  
6 messes up the radiograph. So, that's kind of an  
7 operating principle. Now, that doesn't  
8 guarantee that they used it. I'll just make  
9 that as a remark. People knew then, as they  
10 knew later, what made a good radiograph. And  
11 one of the things you do to get a good picture  
12 is to collimate.

13 Now, on the 80 curie source, and  
14 that's been a continual question mark for me,  
15 Dave, on page 3, you do talk about modeling the  
16 betatron building and calibrating the model  
17 using the cobalt source survey. But that was  
18 just to sort of get an idea of the -- the  
19 shielding ability -- capabilities of that  
20 building. How does that --

21 MR. ALLEN: Yes.

22 CHAIRMAN ZIEMER: And -- and just

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1 in general remark -- general sort of related  
2 things, what -- what is the sort of position of  
3 NIOSH on the earlier work dates for those 80  
4 curie sources? Or, is there a position at this  
5 point? I know that there are those affidavits,  
6 and I've seen some of them.

7 MR. ALLEN: I've seen affidavits.  
8 I've seen them go both ways. There's a number  
9 of people that did work there through '66 that  
10 say they didn't know anything about it, and they  
11 were radiographers. There are others that said  
12 they used it and it wasn't so clear, the exact  
13 dates, when they used that, some of which did  
14 leave before 1968.

15 All we have as far a documentation  
16 to handle the conflict with those is the NRC  
17 documentation, which shows 1968 when they bought  
18 this, I believe it was 1968, when they bought  
19 this 80 curie source, and they were licensed  
20 starting in 1962, if I remember right -- I may  
21 be off a year, for the two smaller cobalt  
22 sources. They were inspected from time to time,

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1 and that seems like a big source to miss in an  
2 inspection.

3 CHAIRMAN ZIEMER: There was an  
4 implication that this source might've been  
5 carried from the East Coast location --

6 DR. ANIGSTEIN: As of last Friday, I  
7 received a -- let me backtrack. Starting with  
8 the last Work Group meeting, I started using  
9 FOIA to try to get information from NRC about  
10 other GSI facilities.

11 One problem with earlier FOIA  
12 requests was confusion of the names because  
13 prior to 1956 it was called the General Steel  
14 Castings Corporation. In '56, they had acquired  
15 other subsidiaries. They decided General Steel  
16 Castings was no longer descriptive of their  
17 work.

18 So, fully descriptive of what it  
19 did, it became General Steel Industries. They  
20 specifically said they want to be called GSI.  
21 So, I managed to put -- This time I clarified my  
22 request. I specifically said "General Steel

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1 Industries or General Steel Castings for  
2 Eddystone, Pennsylvania, from 1954 to 1963."

3 NRC responded through the FOIA that  
4 they did indeed have records for General Steel  
5 Castings at Eddystone for this period, but those  
6 records were turned over to the National  
7 Archives. There was a -- if anyone is familiar  
8 with Kafka, that's about what I went through,  
9 trying to -- "There is no such thing,"  
10 basically, is what I was told on a number of  
11 occasions.

12 Finally, by going back and forth  
13 between NARA--National Archives--and NRC,  
14 clarifying this information, finally, NARA  
15 responded, "Yes, we do have information on  
16 General Steel Castings; however, it's not for  
17 the dates you requested, and it's not for the  
18 location you requested. Goodbye."

19 So, I had to put in a new -- and  
20 they were wrong about the dates, but they said I  
21 was only interested in through '54. No, I was  
22 interested in through '64, no, they misread

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1 that. So, then -- but they did say they had  
2 information. There was nothing on Eddystone,  
3 but there was on Avonmore. Avonmore,  
4 Pennsylvania was the location of the National  
5 Roll & Foundry Company that was purchased by  
6 General Steel Casting in 1955.

7 So, I had to put a second FOIA  
8 request, get back to the back of the line. And  
9 Friday, I got the package. It was  
10 correspondence -- much shorter than the GSI  
11 Illinois docket. It was 75 pages. It was  
12 basically they had requested in '57 the license  
13 for a 10 curie cobalt source, and they purchased  
14 one that was like there was 9 point something  
15 curies.

16 And then there was just back and  
17 forth, the usual. You didn't certify that this  
18 worker had the right training; you didn't -- you  
19 know, the usual bureaucratic -- they didn't shut  
20 them down. They just kept saying you have a  
21 deficiency here. You have a deficiency here.  
22 You have a deficiency here, you have to fix it.

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1                   Finally, in March 1959, a letter  
2                   from the works manager of the Avonmore facility,  
3                   that was now part of General Steel Castings to  
4                   NRC, saying we're not going to bother responding  
5                   to your shortcoming because we have discontinued  
6                   our miscellaneous casting business, and  
7                   therefore, we have no need to do any  
8                   radiography.

9                   We have multiple resources, and we  
10                  are planning to sell it to another General Steel  
11                  Castings facility.

12                 MEMBER MUNN: But this was a 10?

13                 DR. ANIGSTEIN: Pardon me?

14                 MEMBER MUNN: This was a 10 curie  
15                 facility.

16                 DR. ANIGSTEIN: This was a 10. I  
17                 want to dwell on that for a moment, also. And  
18                 then, however, at the end of the -- the license  
19                 expired December 30th, 1959, but the letter was  
20                 in March `59.

21                 Then October 12th, `59, they  
22                 submitted a form, but it was simply of places to

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1 check. And they checked the place where it said  
2 the source was disposed of in accordance with 10  
3 CFR 20. No details. No documentation.

4 So, it is possible -- my first  
5 thought was I got all excited, and I said oh, I  
6 found it right there. I found the smoking gun.  
7 This is the source -- and I'm thinking, wait a  
8 second. What are the dates? This is 1959. In  
9 1959, Granite City was still using radium. They  
10 didn't even apply.

11 So, it just wouldn't make sense that  
12 it would've gotten, under the table, a 10 curie  
13 source and then asked NRC for a license for a  
14 300 millicurie source, which would be licensed,  
15 and then the sources that they actually got were  
16 260-280 millicurie. So, it sort of doesn't add  
17 up.

18 Also, as far as the strength of the  
19 sources, the initial -- I went back over all the  
20 worker testimony, and the worker that -- I'm not  
21 allowed to say his name, but Dr. McKeel  
22 mentioned it. Said about a year ago at a Work

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1 Group meeting in October or something like that,  
2 2009, he simply said, a large curie source.

3 Later on, when the 80 curie source  
4 was being widely talked about, it seems that  
5 they said -- they assigned a value to it.  
6 Originally, they seemed to say it was a large  
7 curie source. The worker that testified was not  
8 the radiographer but assisted the radiographer.

9 So it's possible that it wasn't  
10 really an 80 curie source. It was just a large  
11 source. I have to say, in my opinion, it's  
12 credible that there was a large curie source, I  
13 think 30 to 80 curie, because of the  
14 description: the description that they kept it  
15 on a cart. So, it wouldn't be 250 millicuries.

16 So, if that had been on a cart, it'd be a much  
17 smaller shield.

18 And also, they kept it in the  
19 basement, and they said, if anybody's coming  
20 keep it out of sight. Don't let anyone know  
21 about it. So, it's possible something was going  
22 on, and maybe somehow in 1959, that source was

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1 transferred, not used, maybe went somewhere  
2 else. Who knows? But I find it credible that  
3 there was a large curie source.

4 Now, as far as -- and I have to  
5 credit what Dave Allen said. That was, again,  
6 one worker in a higher position. I don't want  
7 to identify closely, but in a higher position,  
8 who said -- and again it's on the record, I  
9 hadn't heard anything about the large source,  
10 and I doubt that there ever was one.

11 And this person left GSI. He left  
12 the betatron in '64, he went to another position  
13 and was no longer involved with radiography  
14 altogether in '66. So, we have that testimony  
15 as other data. And then finally, as far as St.  
16 Louis testing, I was finding after many attempts  
17 I spoke to -- I think I can mention his name  
18 because he was an official -- his name is  
19 mentioned in my report. Who also spoke at the  
20 meeting of the -- that was arranged by one of  
21 the petitioners who was on the phone -- I mean  
22 it was on the record as far as -- and he

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1 arranged this meeting in Pennsylvania, which  
2 Dave Allen and Stu Hinnefeld also attended. .

3 He described the radiography done  
4 when they brought their sources in, apparently  
5 it was overflow work, which was more than the  
6 GSI people could handle. So, they brought in  
7 the company to do additional radiography. I  
8 talked to him on the telephone, and it's  
9 mentioned in my last report.

10 He said, first of all, one point of  
11 clarification, just since we're talking about --  
12 the two radiographers, which that's what it  
13 sounded like, and that's what Dave Allen wrote,  
14 I asked him for clarification.

15 There's a slight difference between  
16 the original version of my report, and the PA  
17 cleared version. I put in some additional  
18 information about two days later. There was one  
19 radiographer at a time. So, they spelled each  
20 other in a 12-hour shift. So, you did not have  
21 two. There was only one person.

22 So, then it also calls into -- maybe

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1 I'm jumping ahead a little bit. That called  
2 into question well, I'm going to a shift here  
3 for 12 hours. So, there's times where it's  
4 going to be unattended. However, they used the  
5 10 curie sources, 50 curie iridium-192 source,  
6 and later switched to a 10 curie cobalt source.

7 At no time did they ever lend that  
8 source to the GSI personnel. It was strictly  
9 under their own control. They were off at the  
10 end of the property, and that was where this 2  
11 mR per hour perimeter -- you know, obviously  
12 there were opportunities for that perimeter to  
13 be violated.

14 The only difference in my mind that  
15 this makes, because the other exposures are  
16 still bounding, the betatron exposures are still  
17 bounding. The only difference that it makes is  
18 that there were several instances of extremely  
19 high exposures, some of which might've been  
20 spurious and some of which were not explained  
21 away, during the period after 1968. Dr. McKeel  
22 pointed them out -- and the puzzlement before we

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1 got the AEC records was, but what could have  
2 changed? They were doing the same work. They  
3 just weren't handling uranium, but uranium was  
4 not the main source of exposure. So, what could  
5 have changed from 1966 to 1968? Or after the  
6 post-68 period?

7 So, the 80 curie source coming in,  
8 it would've certainly changed things. So,  
9 that's sort of my take on it.

10 Oh, as far as the 250 keV -- the 250  
11 keV X-ray machine, again, I got information from  
12 two workers who were very familiar with this.  
13 Again, one in the higher rank, and the other one  
14 is a radiographer. And they were different in  
15 detail, but they both agreed that the X-ray --  
16 the X-ray work was done in the new betatron  
17 building. There was certainly, more than  
18 adequate shielding in the walls. And the  
19 operator was in the control room.

20 Either there was a cable extending  
21 from the machine to the control room or there  
22 was a time delay where they could push the

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1 button and then have time to get out. So the  
2 actual procedure -- and there was not supposed  
3 to be anyone in the room. Actually, there was  
4 not much personnel exposure, except when there  
5 was an accident. There were at least two cases  
6 where somebody turned on the machine, probably  
7 remotely, and didn't notice or didn't take  
8 trouble to notice there were other people in the  
9 room.

10 So there were some accidental  
11 exposures because we can pull the incidents.  
12 But on a routine basis -- and they worried about  
13 it, the most prolific and corresponding with the  
14 Work Group meetings, and with us said they were  
15 always afraid of this machine. Unlike the  
16 betatron, there were no safety interlocks. The  
17 betatron, the door was locked. You opened the  
18 door, you would interrupt the exposure, whereas  
19 the machine, being a portable one, was not wired  
20 into the interlock system.

21 So, there was a potential for  
22 problems, but the real -- I think my personal

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1 comment is it certainly should be acknowledged.

2 It shouldn't -- my paper commenting on Dave  
3 Allen's paper, Path Forward, was not that this  
4 was a major source of exposure, but it should  
5 not be dismissed altogether. It should simply -  
6 - it was of the technical point.

7 CHAIRMAN ZIEMER: Okay, thanks.  
8 We're going to take a comfort break here for ten  
9 minutes, and then we'll return.

10 (Whereupon, the above-entitled  
11 matter went off the record at 10:49 a.m., and  
12 resumed at 11:02 a.m.)

13 MR. KATZ: Okay, we are back from a  
14 break, TBD 6000 Work Group. Let me just check  
15 in to see if -- I know Dr. Poston is not  
16 intending to join us, but Mark Griffon, are you  
17 on the line? Okay, let me check. Do we have  
18 the petitioners back on the line?

19 MR. RAMSPOTT: This is John  
20 Ramspott.

21 MR. KATZ: Hey, John.

22 DR. MCKEEL: Dan McKeel. I had to

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1 unmute.

2 MR. KATZ: Thanks, Dan.

3 CHAIRMAN ZIEMER: Okay, we're back,  
4 looking at --

5 MR. DUTKO: Dr. Ziemer?

6 CHAIRMAN ZIEMER: Yes, somebody  
7 else? Comment, question?

8 MR. DUTKO: It's John Dutko.

9 CHAIRMAN ZIEMER: Hi, John. Okay,  
10 we'll make note that you're on the line, too,  
11 John. Thank you.

12 MR. DUTKO: I'd like to comment  
13 about the 80 curie source, sir.

14 CHAIRMAN ZIEMER: Oh, yes. Please  
15 do.

16 MR. DUTKO: 1964 or 1965. I know it  
17 was before 1968 because I left in November of  
18 1966. I assisted in a new betatron with an 80  
19 curie cobalt source. It was cable ports in both  
20 betatrons. The channel that we were shooting  
21 was not feasible to shoot a channel yet with a  
22 quarter-curie source of cobalt.

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1                   We were shooting 40 or 50 shots at a  
2                   time weld prep. That means the casting was  
3                   getting ready to leave the -- the plant. In  
4                   some areas, the channel was 16 inches thick. It  
5                   was firing a shot for reading in the control  
6                   room with a survey meter, and found the control  
7                   room to be hot. It promoted us to take our film  
8                   badges off and -- that's one of the reason I  
9                   remember so distinctly the use of that source  
10                  was what happened in the control room. Is  
11                  [identifying information redacted] on the line?

12                  CHAIRMAN ZIEMER:       Apparently not.  
13                  John, thank you for reminding us of that  
14                  experience that you had. I'll just make an  
15                  additional comment, and it goes -- the 80 curie  
16                  sources or source is one that to some extent  
17                  there seems to be conflicting information about  
18                  when it was there or not there, in terms of both  
19                  worker testimony and the official records.

20                  I'll just point out, and I've had  
21                  this personal experience, and that is that it's  
22                  quite possible for sources to appear at a

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1 facility without the license being in place. In  
2 fact, I've had the experience where you come  
3 across a source that has been brought to a  
4 facility somewhat -- well, often in an innocent  
5 way, by someone who thought it was okay to do  
6 that.

7 For example, "Well, the place it  
8 came from had a license, and I know your  
9 facility has a license. Therefore, I can bring  
10 the source." Sometimes people, not realizing  
11 that licenses are often very specific about what  
12 sources and strengths can be there.

13 So, I myself have had the experience  
14 of finding sources that have been brought to our  
15 campus at Purdue, where we were not licensed to  
16 have them, at which point we scrambled to have a  
17 license to cover a source that was already  
18 there. One generally is -- when this happens,  
19 one has to be cautious about how you go about  
20 that.

21 You technically need to report that,  
22 but probably what mainly happens is you get the

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1 license and get it covered and then worry about  
2 whether or not some inspector determines that it  
3 was there earlier. But in any event, I  
4 certainly think it's possible that a source  
5 could have come there earlier, aside from what  
6 the official license may have said. I don't  
7 think we should necessarily rule that out, but  
8 that is one area --

9 MR. DUTKO: Dr. Ziemer, you're well  
10 practiced with radiography. And you all know,  
11 as I do, it is not practical in that thick of a  
12 casting with a quarter curie cobalt source.

13 CHAIRMAN ZIEMER: Well, exactly. I  
14 think we had this conversation before.  
15 Theoretically, it's possible if you want to have  
16 an exposure time which is untenable, you get the  
17 same penetration on the gammas, but it takes  
18 forever to get enough photons through to get a  
19 picture. So, you're quite right on that.

20 The other -- but the -- the other  
21 thing I want to ask: So on the 80 curie source,  
22 there is this question on the start date, and

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1       there seems to be a discrepancy between some  
2       different records.  And we -- I just want to  
3       acknowledge that.  I don't think at this point  
4       we're necessarily saying, "It's got to be one  
5       way or the other."  I think NIOSH's position  
6       appears to be that they would start with the 60  
7       -- well, you wouldn't be saying the 80 curie  
8       source --

9                   MR. ALLEN:  Yes, it is our position  
10       right now.

11                   CHAIRMAN ZIEMER:  Right, okay.  Then  
12       the other -- the other question I want to ask on  
13       source-terms is are there any other source terms  
14       that have not been identified now?  Of course, I  
15       know Dan McKeel, you expressed your frustration  
16       at how long this process has gone on.

17                   One of the things that sort of  
18       extended it is the identification of additional  
19       source-terms that have to be brought to bear.  
20       But in any event, have we now identified all the  
21       source terms?  Keeping in mind that there is  
22       controversy on 80 curie --

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1 DR. MCKEEL: Paul, can you hear me,  
2 please?

3 CHAIRMAN ZIEMER: I can hear you  
4 very well.

5 DR. MCKEEL: I'm sorry. I was just  
6 muted. Well, what my problem is is that Dave  
7 Allen's paper, and no -- no document that I'm  
8 aware of, except the documents that we  
9 transmitted to the Work Group actually identify  
10 all of the sources at GSI on the official  
11 record. Now, it is on the public  
12 docket for GSI, but you know there are three 250  
13 kVp, you know conventional X-ray machines. That  
14 needs to be -- and we know the models, the  
15 names, the voltage. Not sure about the  
16 milliamps, but we know some parameters of those,  
17 and they have not been modeled at all.

18 CHAIRMAN ZIEMER: Yes, I understand  
19 that. I'm talking, and I think --

20 DR. MCKEEL: Well, there's one  
21 source that we have not identified, and that is  
22 that there is worker affidavit testimony by --

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1 I'm going to say his name because I can say his  
2 name to you, and it can be redacted out of the  
3 transcript. But we need to communicate with  
4 each other clearly.

5 His name is [identifying information  
6 redacted], and [identifying information  
7 redacted] was a radiographer who was there for a  
8 long time, but in particular, who was there in  
9 the 1950s. And he said that GSI owned an  
10 iridium-192 source. And he said more  
11 specifically that it was there when he was there  
12 in the early '50s, before he went somewhere. I  
13 think in the service, maybe.

14 Then he returned two or three years  
15 later, and after he returned, the iridium  
16 source, which he said GSI had owned, was not  
17 there anymore. So, there is, apart from  
18 whatever St. Louis testing brought to the site,  
19 you know, as a testing service, there is worker  
20 affidavit at least that the iridium-192 source  
21 was at GSI and owned by GSI.

22 Now, the NRC 2010-0012 FOIA request

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1 that I received did not have an iridium-192  
2 source listed. But it also -- those records,  
3 those licensing records, began in 1962. And we  
4 know that radiography -- and it did refer to the  
5 radium-226 sources, and I know that Dr. Ziemer  
6 has said that it often those -- that they were  
7 not licensed necessarily.

8 So, all that is consistent. But  
9 [identifying information redacted], who,  
10 remember, was one of the two men who gave us his  
11 film badge reports from GSI. He produced those.  
12 Not a FOIA. Not Landauer. Not anybody else.  
13 And to add credibility to his testimony,  
14 [identifying information redacted] had on there  
15 film badge data from 1963, before -- before the  
16 Landauer, and his record had on it particularly  
17 Nuclear Consultants, which as Dr. Anigstein's  
18 recent White Paper pointed out, was the company  
19 identified in the FOIA material as the company  
20 that did the Building 6 radiography survey.

21 So, [identifying information  
22 redacted] has considerable credibility. So

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1 that's a source that I would say has not been  
2 identified, has not been characterized. We  
3 don't have the licensing records for it, but I  
4 would say that it should not be dismissed.  
5 That's the only one I'm aware of -- other one.

6 CHAIRMAN ZIEMER: Okay, thanks.  
7 Thank you.

8 DR. MCKEEL: Oh, I do have one other  
9 thing --

10 CHAIRMAN ZIEMER: Go ahead.

11 DR. MCKEEL: About the 250 kVp  
12 machines. As I understood Dr. Anigstein to say,  
13 he had interviews with two GSI workers, who said  
14 those machines were operated by cables in the  
15 control room of the betatron buildings. And as  
16 John Dutko just said, I am positive it was clear  
17 from seeing the port and photographing it in the  
18 old betatron building, there were cable ports  
19 for the cables that controlled the large cobalt-  
20 60, 80 curie sources.

21 And in fact, the diagrams of the  
22 betatron buildings in that NRC FOIA material

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1 showed drawings of the betatron buildings, and  
2 the control room, and mentioned those cables  
3 running through ports in the control room wall.

4 I don't believe they could possibly be used to  
5 control -- well, let's put it this way. There  
6 was no information that I'm aware of from any  
7 worker that those ports were used for cables  
8 that controlled the industrial X-ray machines.

9 In fact, I don't know of any  
10 evidence that anybody has introduced about where  
11 those portable X-ray machines were actually used  
12 in the plant. And I certainly have never heard  
13 that they were used in the -- in the betatron  
14 building.

15 So I would say that Dr. Anigstein's  
16 interviews, we really need to have those  
17 documented as a memo and put on the official  
18 record, rather than something that's said  
19 verbally at a Work Group meeting. So I would  
20 urge him to please do that, and to please  
21 recount all that information about the FOIA  
22 information that he also received about the

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1 large source. That's about it. Thank you.

2 CHAIRMAN ZIEMER: Okay, thank you,  
3 Dan. John Mauro?

4 DR. MAURO: This is John. I've been  
5 listening, and reading, and clearly, there is a  
6 tremendous amount of granularity here where the  
7 grains are a little uncertain, that is, when  
8 something began, what was there, what was done,  
9 how it was done.

10 And I think getting as much factual  
11 information into the record that we possibly  
12 can, and where the uncertainties are regarding  
13 time and size and distance and shielding is all  
14 very important to be as complete as you can.

15 All I would say is that as we march  
16 through every one of these items, and we discuss  
17 the facts of the matter and agree that maybe we  
18 don't have all the facts or not as clearly as  
19 we'd like, I think we have to -- the other half  
20 of the conversation should be, "Okay, what about  
21 it?" All right?

22 Because we're always in this

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1 situation. That's what this is all about. We  
2 go back to the 1950's; you're going to have  
3 this. And so, I keep asking myself as I'm  
4 listening, whether or not the -- the cobalt-60  
5 in a large source, whether it was 10 or 60, was  
6 there at 1968, '66, '64 or earlier? The radium  
7 source, the 250, was that pole -- did they use  
8 the fish pole? Was the pole 10 feet, 12 feet,  
9 six feet?

10 In other words, I listen to all  
11 this, and all of this is important to get on the  
12 record and get it right, but we all know we're  
13 going to reach a point where we know we're not  
14 going to be sure it's right. The question is,  
15 does that mean we have a situation where we  
16 can't reconstruct the doses? And therefore, we  
17 have an SEC.

18 So, you have to -- so, along with  
19 every one of these, you have to ask yourself  
20 that question. I do that all the time. And I  
21 know that I'm coming to a place where I think  
22 that a lot of the things we're talking about are

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1 tractable, but some of them may not be. And  
2 there may even be a disagreement around the  
3 table as to what's tractable and what's not, and  
4 that's important to discuss.

5 I would like to just point out that  
6 -- just to sort of step out of the weeds and  
7 step back, and this comes a lot from  
8 conversation I've had with Bob. It's that it  
9 seems to be 1962 was a very important date.  
10 It's the date when after that date, the AEC  
11 radiological controls, and Bob, please correct  
12 me if I give -- but I'm trying to give up a  
13 bigger, broad brush; where the controls came in,  
14 where there was some attention and regulatory  
15 oversight.

16 However, prior to that, which is  
17 when they may not have had a lot of sources  
18 licensed by the NRC, and the -- but they did  
19 have the radium source, and there may not have  
20 been as rigorous health physics oversight, and  
21 it turns out -- it also turns out that it also  
22 is a time period when there aren't any film

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1 badge records available to us.

2 So, I'll stop now at this point. In  
3 my mind, that is a watershed date. And  
4 notwithstanding the uncertainties in a lot of  
5 the things we're talking about, notwithstanding  
6 the fact that, listen, we could postulate  
7 anything about any source, anywhere, and model  
8 it. And I think that certainly Bob and David  
9 could say, "No. You should've used this, this,  
10 this occupancy time, this source, this  
11 shielding."

12 All that is tractable once you agree  
13 on what is the bounding set of conditions. So,  
14 I'm not that disturbed by these differences.  
15 What I am disturbed by is unanticipated  
16 consequences, accidents, mishandling, the degree  
17 to which it may or may not have occurred. And  
18 if it did occur, are we in a position to deal  
19 with it? Are there enough records to say, "Yes,  
20 we know there were no accidents?"

21 Now, I suspect, and I'll say -- and  
22 I've said it before. This is the one area as a

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1 health physicist and as a person trying to  
2 reconstruct doses for any given person that I am  
3 troubled by. I'm not sure what I would do to  
4 reconstruct a person who was there from '53 to,  
5 let's say, '60, who worked in various  
6 capacities, and say, "I feel confident that  
7 whether it's a 6 rem per year that is being  
8 offered up as the upper bound number, or one of  
9 the higher numbers, or the number we've  
10 estimated was on the order of 13 rem per year."

11 I mean, we all said, stepping back,  
12 all of the noise, does that somehow cap it  
13 reasonably and plausibly, or maybe not? And is  
14 -- and in my sense, this is where it all comes  
15 out. You see, we're not going to resolve all  
16 this to everyone's satisfaction.

17 What we have to be able to resolve  
18 is, do we feel that we could place a plausible  
19 offer bound on those years when there is no film  
20 badge data? On those years where there was  
21 relatively little radiation protection oversight  
22 by the regulatory authorities? I think this is

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1 where the heart of the matter lies.

2 CHAIRMAN ZIEMER: Okay. Thanks,  
3 John. I think you certainly gave us some good  
4 insight on that, and I certainly can't disagree  
5 with that. I do have a question on the iridium.  
6 Now, I do want to ask Dr. McKeel to remind me.  
7 What was [identifying information redacted]'  
8 work dates at General Steel, or roughly? Do you  
9 remember, Dan?

10 DR. MCKEEL: I believe he was there  
11 from like very early, like 1951. It seems to me  
12 he stayed there through the end of the --  
13 through the end of the operational period, the  
14 AEC contract period, and maybe even beyond. You  
15 know, GSI operated until 1973. So, there was  
16 that break in the Army in the mid-1950's. But  
17 that's my recollection.

18 CHAIRMAN ZIEMER: Okay, and --

19 DR. MCKEEL: And he was a  
20 radiographer, and one of the AEC isotope trained  
21 operators.

22 CHAIRMAN ZIEMER: Right.

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1 DR. MCKEEL: Yes.

2 CHAIRMAN ZIEMER: We do know St.  
3 Louis Testing used iridium, isn't that correct?  
4 But I think what you're saying is that  
5 [identifying information redacted] was there  
6 prior to St. Louis Testing coming on the scene.  
7 Is that correct?

8 DR. MCKEEL: Correct.

9 CHAIRMAN ZIEMER: Yes.

10 DR. MCKEEL: And he was quite  
11 explicit that it was owned by GSI.

12 CHAIRMAN ZIEMER: Yes. I was trying  
13 to get a feel for this because we do know people  
14 could get radium easily because it was not  
15 controlled license-wise. You could not get  
16 iridium, even in the 50s without a license. I  
17 mean you could not get it. Somebody had to have  
18 a license to get iridium.

19 DR. MCKEEL: I understand that, but,  
20 Paul --

21 CHAIRMAN ZIEMER: Let me finish.

22 DR. MCKEEL: Okay, sorry.

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1           CHAIRMAN ZIEMER: So, that -- if the  
2           iridium was there, there either had to be a  
3           license, or somebody licensed had to have come  
4           aboard to provide the iridium for use. I don't  
5           think there could have been iridium there  
6           without somebody being -- somebody, whoever  
7           owned it, whether its GSI or some outside group,  
8           somebody had the license. We don't know.

9           But, I think at this point, and --  
10          did [identifying information redacted] provide  
11          information on what he thought the strength of  
12          that source was?

13          DR. MCKEEL: Not that I remember.

14          CHAIRMAN ZIEMER: Okay.

15          DR. MCKEEL: The comment I wanted to  
16          make, however, is -- and I think the experience  
17          with FOIA requests at GSI should teach us all  
18          this, that I also made an independent, separate  
19          FOIA to get the fuel source byproduct licenses  
20          from Eddystone, Pennsylvania, which was a  
21          division of General Steel Industries, and we  
22          knew for certain that they used 80 curie cobalt-

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1 60 source there. And so -- and I was explicit  
2 to the NRC.

3 This was after the successful FOIA  
4 for the Illinois site, but I wrote explicitly  
5 about Eddystone, Pennsylvania GSI. Named all  
6 the company names, and included all the covered  
7 period, and really up to 1973, knowing that  
8 Eddystone transferred from Pennsylvania to  
9 Illinois.

10 And NRC, I didn't mention this, but  
11 when they responded to me, they said they didn't  
12 have any Eddystone, Pennsylvania records, but  
13 they did send the redacted copies of all of Dr.  
14 Anigstein's correspondence about his previous  
15 FOIA to the NRC.

16 So, I read all of that as well. So,  
17 here we have a situation where we know, we have  
18 pictures, of the -- we have pictures of the  
19 Eddystone betatron building, and the betatron  
20 installation at Eddystone. We know that was  
21 there. We know there was a cobalt-60 source, at  
22 least.

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1           There may have been other sources,  
2           but in other words, we did not -- and I asked  
3           for both of those; anything they had in the way  
4           of betatron records, anything they had in the  
5           radiation and device records, registration  
6           records, and anything that had to do with the  
7           byproducts and the isotopes, and I named cobalt-  
8           60 in particular.

9           And NRC wrote back and said, We  
10          don't have any records of Eddystone. So, I  
11          would say the same thing. They must have had  
12          those records. They had to have those records.  
13          And if you remember, the first NRC FOIA that I  
14          wrote about GSI in Granite City, Illinois, came  
15          back, no records.

16          Second request, several years later,  
17          came back 1,016 pages, every page of which was  
18          relevant to that question I'd asked in 2006. So,  
19          the agencies do not supply records that they  
20          have, and I don't know all the reasons, but I  
21          know a lot of them. And it doesn't matter what  
22          the reasons are. They do not produce the

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1 records that they actually possess. So, that's  
2 all I know.

3 CHAIRMAN ZIEMER: Thanks for that  
4 input. I think you're quite right. I suspect  
5 part of it is simply they're unable to find  
6 them, but they - - they probably exist or did  
7 exist somewhere. Bob has a comment here.

8 DR. ANIGSTEIN: Yes, I have several  
9 comments. One is since we were going back and  
10 forth, I saw copies of the original Dr. McKeel's  
11 2006 request, which mentioned the -- I think at  
12 that time, we were all unclear about the name.  
13 His request mentioned General Steel Castings  
14 Corporation, and Granite City Steel, which there  
15 was some confusion right up until some time ago.

16 Of course we all know now that  
17 United States Steel purchased the property of  
18 GSI, the Commonwealth facility, in 1973. But  
19 they did not have any radiography records.

20 So, not that I have any reason to  
21 defend NRC, but in this case, I think that they  
22 did the right thing. There were no -- because

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1 the records for, lets just call it the  
2 Commonwealth facility, because that was the  
3 original name. It was called the Commonwealth  
4 before GSI.

5 There were no records for the  
6 Commonwealth facility until 1962. In 1962, it  
7 was six years after the name change from General  
8 Steel Castings to General Steel Industries. So,  
9 NRC would've been quite right to have said, We  
10 have no records for General Steel Castings or  
11 Granite City Steel, or in Granite City,  
12 Pennsylvania -- Granite City, Illinois, for any  
13 of the covered period.

14 Then the other way around, the FOIA  
15 request for General Steel Industries would not  
16 have brought up information on Eddystone or on  
17 Avonmore. Now, I do say that I was a little  
18 puzzled when NRC told me they do -- they did  
19 have records for General Steel Castings at  
20 Eddystone, which they turned over to NARA. And  
21 they gave the box number, the lot number,  
22 everything that's necessary to identify it.

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1           NARA said they went through that  
2 box, and not only that, they even went through  
3 the box before and after it just to be on the  
4 safe side, and found nothing on Eddystone. But  
5 they did find Avonmore.

6           When I got back to NRC, and I said,  
7 Are you sure? And I would be talking to the FOIA  
8 specialist. I did not have access to the  
9 records people. She would then have to go to  
10 the records people, as sort of a go-between.  
11 Are you sure that they told you they had  
12 Eddystone, or did they simply take -- you know,  
13 because I had asked for Eddystone, and they had  
14 records for General Steel Castings. They just  
15 said, oh, yes, that's Eddystone.

16           CHAIRMAN ZIEMER: Well, let me  
17 interrupt at this point. We can go back and  
18 forth in who had the records and didn't, and  
19 what they -- why they might not have found them.

20           I think the point is we have what we have.  
21 There's some indication that there could have  
22 been an iridium source there, even though we

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1 can't find the license for it.

2           It may have been there. We don't  
3 know the size of it although one -- one could --  
4 one could ascertain what would be the typical  
5 practice. You know, like a 50 millicurie if  
6 they're doing radiography. I think one could  
7 still model it.

8           Im not saying at this point that  
9 were accepting that there was, but Im saying one  
10 option would be to say, All right, we don't know  
11 that there wasn't. Maybe we should assume that  
12 there was a source of this size, which would be  
13 reasonable, based, for example, on [identifying  
14 information redacted] testimony.

15           So, at least we've identified two  
16 uncertainties on source terms. One is the  
17 presence of iridium, prior to the St. Louis  
18 testing. The other is the presence of the 80  
19 curie cobalt, prior to the license period. I  
20 think those are uncertainties.

21           We need to deal with those at some  
22 point. I think the burden is on NIOSH at this

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1 point to say, Okay. And NIOSH has -- there's  
2 some conflicting testimony. I think NIOSH has  
3 to determine what their position is on this. I  
4 think a priori we don't predict it. They  
5 haven't said specifically.

6 I mean at the moment, those two -- I  
7 think all I can do here is say, have we covered  
8 the sources? Petitioners raised some questions  
9 on this. That serves as input for us to  
10 consider. I assume that Work Group at least  
11 would like this to be in the mix as NIOSH  
12 considers where they go on this; that there may  
13 have been these two sources there in those  
14 years. Does that make sense at the moment?

15 And I would say in the absence of --  
16 I don't know that [identifying information  
17 redacted] identified the -- McKeel, you can  
18 correct me, but if he didn't identify the  
19 source, I would tend to use a value that would  
20 be typical of an iridium source, such as the --  
21 I think they had a 50 millicurie in St. Louis.

22 DR. ANIGSTEIN: 50 curie.

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1                   CHAIRMAN ZIEMER:  Curie, I meant 50  
2                   curie.  Bob, additional comment?

3                   DR. ANIGSTEIN:  Yes.  The thing that  
4                   has been overlooked is iridium has a 70-day  
5                   half- life.  So for a company to have an iridium  
6                   source, it'll soon be gone.  The way they are  
7                   handling --

8                   CHAIRMAN ZIEMER:  I know.  You have  
9                   to send them back and get a new --

10                  DR. ANIGSTEIN:  Well, actually, just  
11                  send it back and have it irradiated.

12                  CHAIRMAN ZIEMER:  Well, either way.

13                  DR. ANIGSTEIN:  So, for that to be  
14                  an ongoing practice without a license seems --  
15                  there are very few places that could do that.

16                  CHAIRMAN ZIEMER:  Well, I think the  
17                  point being made is we don't know whether there  
18                  was a license at this point, right?

19                  DR. ANIGSTEIN:  I see.  Okay, I  
20                  accept that.

21                  CHAIRMAN ZIEMER:  Right.  Typically,  
22                  you're good for several half-lives.  I mean you

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1 just adjust the exposure times. You're not  
2 going to go ten half-lives, but you might go two  
3 to three. So, you might be good for a year on  
4 an iridium source.

5 Well, yes, that gives you five half-  
6 lives. So, yes, that may be a little too long.  
7 You can go -- certainly, you can go half a year.  
8 Then you're exchanging it. And we don't even  
9 know, based on [identifying information  
10 redacted]. Maybe they had one. We don't know  
11 how long at this point. Was it for his full  
12 time at General Steel?

13 But in any event, I don't think well  
14 solve it here. I just want to -- these are  
15 questions.

16 DR. ANIGSTEIN: Also, I can answer  
17 one of your questions because I spoke to  
18 [identifying information redacted] just Sunday.

19 And he specifically said he joined General  
20 Steel in 1953. He wasn't specific of the date.

21 But he remembers he was laid off in  
22 [identifying information redacted] 53, and

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1       separately he had told Terry Dutko that he was  
2       not a radiographer at that time.

3                   Then he went into the Army in 54.  
4       Got out in 56. Came back to General Steel, and  
5       then became a radiographer, and he worked with  
6       iridium sources. He was of great interest,  
7       because he was the only person I could get  
8       information on the iridium source..

9                   CHAIRMAN ZIEMER: Did he mention  
10       iridium to you?

11                   DR. ANIGSTEIN: No. I simply asked  
12       him about the fish pole technique.

13                   CHAIRMAN ZIEMER: Okay, thank you.  
14       Any other questions on the source terms? Lets  
15       go ahead and look at the Path Forward. What --  
16       the statement here is that a new exposure  
17       estimate for each source would be made. These  
18       would be based on categories. I think, Dave,  
19       you're talking about worker categories like,  
20       what would it be for the radiographers? Is that  
21       right?

22                   MR. ALLEN: Yes. I had two

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1 different scenario types of things listed in  
2 there. One is for different workers, such as  
3 radiographers. There was a guy working on the  
4 roof of the betatron, et cetera. The worker  
5 scenarios.

6 CHAIRMAN ZIEMER: Right.

7 MR. ALLEN: And a separate category  
8 is exposure scenarios, such as a betatron flip  
9 in the head, or shooting at the railroad tracks,  
10 or upward angle, et cetera.

11 CHAIRMAN ZIEMER: Right.

12 MR. ALLEN: Or if the source was in  
13 the radiography room in building 6, or out in  
14 the open delineated. So, there was what I was  
15 calling shot scenarios, versus worker exposure  
16 scenarios. And need -- I need to have an  
17 exhausted list of each of those types of  
18 scenarios. I tried to capture the main ones  
19 here in this document, but I didn't want to  
20 pretend I had an exhaustive list. I haven't  
21 gone through all the transcripts, that sort of  
22 thing, to itemize all --

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1                   CHAIRMAN ZIEMER:  Let's say you have  
2                   a radiographer.  Would you be -- in the model.  
3                   In the absence of film badge information now,  
4                   for example, would you -- would your model look  
5                   something like this?  A typical radiographer  
6                   would take so many shots per, lets say, week.  He  
7                   would do this other -- or handling something so  
8                   many times a week for each of the scenarios.  Is  
9                   that what were talking about here, or can you  
10                  kind of spell it out?

11                  MR. ALLEN:  Yes.  For the betatron,  
12                  it gets a little more complicated, but  
13                  essentially you get very different dose rates  
14                  from, say, flipping the head, versus a more  
15                  typical shot.

16                  CHAIRMAN ZIEMER:  For each of the  
17                  scenarios you have on dose rate, or maximum dose  
18                  rate --

19                  MR. ALLEN:  And I was going to come  
20                  up with a -- maximum dose rate and dose rate in  
21                  various areas, and in the control room.  We have  
22                  control badges or actually control room film

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1 badges in the -- in that room, and then start  
2 putting these scenarios together, like what  
3 fraction of the time they did this shot versus  
4 that shot to maximize that in the control room  
5 without going over what the film badge has  
6 showed in the control room as par of that  
7 reconciling all the data I was talking about  
8 earlier.

9 There's various scenarios as far as  
10 how often they flipped the head, or how often  
11 they did another type of shot. But whatever  
12 combination of these shots you put together, and  
13 how often they did these, and how long those  
14 exposures were all need to collimate to the film  
15 badge readings in the control room.

16 MR. RAMSPOTT: Dr. Ziemer?

17 CHAIRMAN ZIEMER: Yes?

18 MR. RAMSPOTT: This is John  
19 Ramspott. May I make a brief comment?

20 CHAIRMAN ZIEMER: You bet.

21 MR. RAMSPOTT: It's pertinent to  
22 Dave's last couple statements, and it involves -

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1 if you look at the first sentence in his report.

2 I'm going to come back. I think Dr. Mauro made  
3 a very, very pertinent observation, bottom line.

4 NIOSH obtained film badges from  
5 Landauer. That's in the first sentence of this  
6 white page report, or the Path Forward report.  
7 We need to clarify that a little bit. And Dave,  
8 you correct me if I'm wrong, if you would,  
9 please.

10 But would you tell everybody exactly  
11 what film badges you have, and when you start --  
12 the starting date on your information?

13 MR. ALLEN: Yes, it starts the  
14 beginning -- the actual data we have starts at  
15 the beginning of 1964, but mentions that the  
16 badging actually started, I believe, November of  
17 63

18 MR. RAMSPOTT: Okay, November,  
19 December, January. As far as I'm concerned, 64.  
20 Is that pretty accurate?

21 MR. ALLEN: Yes. That's what I  
22 would ballpark it as.

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1                   MR. RAMSPOTT:    Yes, that's what I  
2    would too.    But prior to 1964, you have no  
3    information.   No film badge information, period.  
4    Would you agree with that or disagree with that?

5                   MR. ALLEN:    I agree we have no film  
6    badge information, yes.

7                   MR. RAMSPOTT:    Okay.   Now, models --  
8    now, your last five sentences all have to do  
9    with film badges.    You're going to base  
10   everything off of film badges, and you're even  
11   talking about control badges.   The control badge  
12   that you have started in November of 63.   Now,  
13   what are you going to do with everything that we  
14   know prior to 63 when it comes to an SEC about  
15   being able to do dose reconstruction?

16                   You don't know what shots were made.  
17   You're talking about flipping the betatron head.  
18   Dave, you don't have any information.   You don't  
19   have any accurate information.   I mean you -- it  
20   seems like worker statements all get kind of,  
21   okay, maybe.   But you want to try to do your  
22   dose reconstruction, now all of a sudden except

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1 some maybes? You got to help me here, because  
2 it just doesn't add up scientifically.

3 MR. ALLEN: We have -- well, like  
4 you said, we do use the worker information. We  
5 try to reconcile where they conflict, and part  
6 of the information was the head flipping thing  
7 didn't start until after the film badge stuff.  
8 More of the information indicated that the  
9 workload increased --

10 MR. RAMSPOTT: How do you know the  
11 flipping of the head didn't start until after  
12 the film badge?

13 MR. ALLEN: That was part of the  
14 worker testimony.

15 MR. RAMSPOTT: You have testimony  
16 from guys that worked there in 1952?

17 MR. ALLEN: We have information that  
18 that didn't start until after -- I guess I cant  
19 say the name, but --

20 MR. RAMSPOTT: Yes, I know who you  
21 mean.

22 MR. ALLEN: After he had left that

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1 area.

2 MR. RAMSPOTT: So, he's the guy that  
3 - - well, wait a minute now. That manager had  
4 nothing to do with it. We corrected that at one  
5 of the earlier meetings. It actually started  
6 earlier than that.

7 MR. ALLEN: No. I originally said  
8 that it didn't start until after he left, and  
9 that was after the contract period.

10 MR. RAMSPOTT: Well, that's wrong.  
11 Im talking about --

12 MR. ALLEN: I understand, John. I  
13 was corrected that he left the betatron area  
14 prior to leaving the site, but that still he  
15 left the betatron area after the film badges --

16 MR. RAMSPOTT: That gentleman you're  
17 referring to, initial GB, is not the person that  
18 taught the workers how to flip the betatron  
19 head.

20 MR. ALLEN: That's what I'm saying,  
21 John. It didn't start until after he had left  
22 that area, and he did have a film badge earlier

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1 on, and then left that area, and the next guy  
2 came in and taught them how to do that.

3 MR. RAMSPOTT: I guess what Im  
4 coming back to is your film badge -- you keep  
5 basing everything on film badges. You don't  
6 have any prior to 64. I guess that's my main  
7 problem, Dave.

8 MR. ALLEN: I understand that, and  
9 its not exact prior to that, but we do have a  
10 lot of information that they started -- it went  
11 from a slow QA process to 100 percent quality  
12 control type of process after about 63, which is  
13 why they built the new betatron, and why they  
14 started --

15 MR. RAMSPOTT: November of 63,  
16 almost 64

17 MR. ALLEN: Okay, and that's when  
18 everything really started firing up, and they  
19 started going around the clock. They had quite  
20 a few more radiographers that they hired, and I  
21 think the GB, as you put it, said something  
22 like, They were instantly -- I think he said,

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1 Over 400 percent over-scheduled, or whatever at  
2 that point.

3 There's information that it was a  
4 lot more utilization from sources, especially  
5 the betatron, after they started badging them,  
6 or right about that time.

7 MR. RAMSPOTT: That part is  
8 accurate, but the other part that gives us some  
9 problem is that all the other sources, fish  
10 pole, radium small cobalt; that had nothing to  
11 do with the 1963 betatron. That was all done  
12 outside the betatron.

13 That's the problem. And no badges,  
14 for a lot of sources outside of the betatron,  
15 and the betatron didn't go into effect at  
16 General Steel until almost 64. A new betatron.

17 CHAIRMAN ZIEMER: All that other  
18 source work?

19 MR. RAMSPOTT: That was being done  
20 in the plant.

21 CHAIRMAN ZIEMER: Yes. Let me make  
22 a general comment on this, John.

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1 MR. REYNOLDS: Yes, sir.

2 CHAIRMAN ZIEMER: And that is you  
3 obviously aren't relying on film badges for the  
4 rest of that work. That's the reason why the  
5 source-term information becomes important, and  
6 this is a -- this is a general approach that  
7 NIOSH uses, which is identified under the  
8 regulations as a proper procedure.

9 For example, if I have a source, and  
10 I know the size, and I know something about the  
11 working conditions, I can reconstruct that and -  
12 - and take a worst case, like, for example, if  
13 you're using a fish pole method with the radium  
14 source, and I know that radium sources output,  
15 and I can put a limit on how many exposures can  
16 be made physically in a day and how long that  
17 radium source is going to be out, I don't need a  
18 film badge to calculate the dose to the person.

19 I'll take worst-case scenarios, and  
20 you can do that. So, the -- and there are  
21 uncertainties clearly. As you may know under  
22 the NIOSH process, the presence of uncertainties

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1 typically helps the claimant because it spreads  
2 the -- it spreads the -- it spreads the -- I was  
3 going to say the dose information, but more  
4 correctly, the Probability of Causation figures  
5 upward so that the Probability of Causation  
6 becomes more likely as the more likely as the  
7 uncertainty goes up.

8 MR. RAMSPOTT: I totally agree.  
9 That's my point.

10 CHAIRMAN ZIEMER: Yes. Well, so, in  
11 one sense, the worst, your uncertainty, the  
12 higher the dose up end up assigning to the  
13 worker, which makes the Probability of Causation  
14 actually go up. Not that we want to be  
15 completely uncertain, but the uncertainty can be  
16 taken into consideration. So that -- and the  
17 models are designed to do that.

18 What were trying to pin down here is  
19 if you're doing the modeling, you have to know  
20 what sources are present and if some are  
21 omitted, then that could affect your outcome.  
22 So, we want to make sure we have those and then

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1 we want to look at how the sources are handled.

2 The experience is not very different  
3 from a medical facility. I can predict how much  
4 those medical technicians will get without that  
5 person wearing a film badge. I want them to  
6 wear a film badge so I can document it, but  
7 there's only so many exposures a person can make  
8 in a -- in, say, an eight or 12-hour work period  
9 in terms of set up, taking the picture, and  
10 developing it.

11 So, if you make reasonable  
12 assumptions about how you do things, or what it  
13 takes to -- you know, what's involved in the  
14 flipping, or what's involved in the set up, or  
15 what's involved in the exposure; you can come  
16 out with pretty reliable estimates of dose.

17 I believe NIOSH is saying that for  
18 the film badge period, they want to also  
19 reconcile their models with what they actually  
20 are reading. If your models are coming out 1,000  
21 times bigger than your film badge doses, which  
22 could happen, because if you keep making worst-

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1 case assumptions, then you're saying, Well,  
2 okay, I'm modeling this, but its maybe not a  
3 reasonable model, or the other way.

4 If the models are 1,000 times less  
5 than what you would get when you have both the  
6 model and the film badge, then you know you're  
7 off too. So, where you have both, you want to  
8 cross-calibrate. But I believe that's what the  
9 approach is, but Dave, you can speak for  
10 yourself.

11 Its not unreasonably to try to use  
12 the -- what dosimetry values we have to sort of  
13 cross calibrate against the modeling to see if  
14 its at least reasonable, and there are some  
15 other uncertainties that well be talking about,  
16 which have to do with accidents and so on.

17 DR. MAURO: Yes, Paul, I agree with  
18 that absolutely. These are tractable. You  
19 could come -- my problem is, just that looking  
20 at the data for radiography in general, and then  
21 look at it specifically for radiography when  
22 they do have film badges, specifically here.

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1                   For example, I just confirmed that  
2                   there was one worker, 1969, that received 39  
3                   rem.

4                   DR. ANIGSTEIN:   Except that this was  
5                   retracted.

6                   DR. MAURO:    Oh, I misunderstood.

7                   DR. ANIGSTEIN:   Okay.

8                   DR. MAURO:    See, I just wanted to  
9                   make sure I have the facts right.

10                  DR. ANIGSTEIN:   There was a whole  
11                  big correspondence about --

12                  DR. MAURO:    Okay.  My only concern,  
13                  as one of the folks helping out with this, is  
14                  that could there have been incidents in that  
15                  ten-year period when there was no film badge  
16                  data, that there could've been some workers  
17                  there that got substantially higher doses than  
18                  the doses you folks plan to assign or to  
19                  monitor?

20                  If its reasonable to assume, yes,  
21                  that happens from time to time --

22                  DR. ANIGSTEIN:   Of course.  The guy

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1 that took the radium source, well --

2 DR. MAURO: And there's -- therein  
3 lies my difficulty. Now, I thought the 39 was a  
4 real number. Please let me reflect -- whatever  
5 the real number is I don't know.

6 CHAIRMAN ZIEMER: Let's not get into  
7 discussion of those specific cases.

8 DR. MAURO: Okay.

9 CHAIRMAN ZIEMER: We can talk about  
10 the general case, and maybe its premature, but  
11 on -- on accidents, if you postulate an  
12 accident, I can think of a worse one, right?  
13 All right, so that leads you down a terrible  
14 path.

15 DR. MAURO: Yes, it does.

16 CHAIRMAN ZIEMER: So, if you're  
17 going to do accidents, you got to look at  
18 likelihood. And if you look at likelihood, you  
19 can actually get into frequency because I --  
20 tell me, for example, what's the worst plane  
21 accident? I ask my students this. What's the  
22 worse plane accident you can think of?

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1 Well, they'll say what about, you  
2 know, we get a supersonic -- not a supersonic  
3 but the big planes that hold lots of people, and  
4 we'll crash them into -- have a crash that kills  
5 a lot of people --

6 MEMBER MUNN: Over a highly  
7 populated area.

8 CHAIRMAN ZIEMER: Yes. I can keep  
9 thinking of a worse accident. It becomes less  
10 and less probable.

11 MEMBER MUNN: And there's a Super  
12 Bowl.

13 CHAIRMAN ZIEMER: Yes, and there's a  
14 Super Bowl, and so on. So, that we want to  
15 steer clear of. We want to say, Okay, are there  
16 reasonable accidents? And I wouldn't call them  
17 accidents even. Dave talked about the one that  
18 they've identified. Unmonitored workers walking  
19 through the area.

20 Okay, that's reasonable.  
21 Unmonitored workers going and sitting by the  
22 source to have lunch? No, not a reasonable

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1 accident or scenario. So, some of that they're  
2 dealing with. Could there have been a case? You  
3 could say that at every site, could we have  
4 missed something? Sure.

5 DR. MAURO: But Paul, we have two  
6 juxtaposed problems that I see, and I'm trying  
7 to reconcile them myself. We don't -- if you're  
8 working in a radiography facility, and it's in  
9 the 1950's, and you don't have any film badge  
10 data, you're very vulnerable, the degree to  
11 which such things occurred.

12 Second, there are records, and I'm  
13 sure we can get them from the NRC, of what is  
14 the frequency where people have received  
15 exposures in excess of the 5 rem per year limit  
16 in the radiography business? And they maintain  
17 records.

18 Now, whether they go back to the  
19 50s, we could probably get them later. In other  
20 words, are we talking -- see, this is the one  
21 industry that is notoriously famous for having  
22 unusual --

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1                   CHAIRMAN ZIEMER:    Right.    In fact,  
2                   the highest exposures in NRC's and AEC's records  
3                   are radiographers.    There's a good NCRP report  
4                   on this, and most of it is during this time  
5                   frame.

6                   DR. MAURO:    So, I ask myself --

7                   CHAIRMAN ZIEMER:    And they were very  
8                   frequently going beyond limits.    Very common.

9                   DR. MAURO:    Now, I'm saying I'm  
10                  putting myself in your shoes.    I said, Okay, how  
11                  do I answer the question for myself that I feel  
12                  we've got a tractable situation.    And the way I  
13                  would feel comfortable is that there were  
14                  records, but we don't have the film badge.

15                  Okay, that's -- that really puts a  
16                  crimp in my ability to say, I've got control of  
17                  the situation.    But that doesn't mean that's the  
18                  end of the story.    And there may be records that  
19                  were maintained, that said whenever there was an  
20                  off-normal, which there often is an off-normal  
21                  circumstance, the person took some something, or  
22                  did something they really shouldn't have done.

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1 Is that -- is there reason to believe it was  
2 recorded? Is there reason to believe it wasn't  
3 recorded?

4 So, Im struggling with that myself  
5 right now. So -- and I'll be the first to say I  
6 am not the least bit concerned about the ability  
7 of Dave and NIOSH to come up with bounding,  
8 plausible scenarios like you just described to  
9 deal with everything, everything from the  
10 beginning to the end, by making appropriately  
11 conservative assumptions that are still  
12 plausible, and assign a dose on that basis.

13 I have been troubled from the very  
14 beginning on this one. It is to deal with a  
15 ten- year period, no film badges, and its  
16 radiography. And I know from way back that's a  
17 knotty problem, and I feel as if somehow we've  
18 got to put that to bed.

19 And we've been talking a lot about  
20 the list, but quite frankly, I don't think we've  
21 been talking about the subject that's really --  
22 that is an issue of concern to me. Now, that

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1 doesn't mean its not tractable. There may be a  
2 way to come to grips with this, but we haven't  
3 been talking about that, and I want to hear more  
4 about that.

5 DR. ANIGSTEIN: I would like to -- I  
6 concur, but I want to offer more detail. 1962  
7 to 64 there were radiation controls. You had  
8 this gentleman who was at that time PhD/CHP, who  
9 was called in as a consultant, purely of course  
10 so that they could get their AEC license. He  
11 supplied the film badges, and they had radiation  
12 safety.

13 They trained the people. They gave  
14 -- so, they had some -- it was a reasonable  
15 safety program that the AEC accepted. The  
16 question mark with the training was minor  
17 things.

18 Prior to that time, we're going back  
19 to 53, and I believe there's a possibility they  
20 may extend it to 52, depending on DOL. At that  
21 time, the NRC was not even authorized to control  
22 civilian use of radioactive materials. It was

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1 not until the Atomic Energy Act Amendment of  
2 1954 that they had the authority.

3 The State of Illinois did not get  
4 into the business. There were some indications  
5 that the Department of Health assigned some  
6 responsibilities in 1957, but the earliest  
7 documented rule came out in '61. It was an act  
8 by the State Legislature, I believe in 1959,  
9 that really authorized them specifically to  
10 start regulating radiation, and '61 the rules  
11 came in. I think then by coincidence in '62,  
12 they told GSI they cannot use fish pole  
13 technique. I don't think they were ever told  
14 they could use the fish pole technique. They  
15 simply never -- it took them some time to get  
16 around to inspecting every facility, and finding  
17 out what they were doing.

18 So, the radium, prior to '62, was  
19 unregulated by anyone. And -- and there does  
20 not seem to be any semblance of a radiation  
21 safety program at GSI prior to '62. I mean  
22 there were people who knew something about it.

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1 They took precautions.

2 They obviously didn't handle  
3 [unintelligible] -- I don't know if everyone saw  
4 the email that I sent over the weekend to the  
5 Board members on my interview with -- his name  
6 was already mentioned, [identifying information  
7 redacted]. He would describe to me how it was  
8 done. I had no idea how the fish pole was done.

9 It was apparently not a 12-foot  
10 pole. There was one worker walking through the  
11 facility that he saw them using it. He said it  
12 was a four to six foot pole, and I have  
13 photographs that indicate six feet would've been  
14 more reasonable. You know, they were careful.  
15 They used this pole, and we can calculate based  
16 on that scenario, easily calculate, what the  
17 doses were.

18 They were not as high as I  
19 postulated. I said something like 28 rem. I  
20 just made that up. That was a made up scenario.

21 Then I got the real facts. So, it's less than  
22 that --

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1                   MEMBER BEACH:    It sounds like they  
2                   were careful, but they didn't put the lid back  
3                   on that source.

4                   DR. ANIGSTEIN:    But as he said, it  
5                   was like a little tunnel, and only if you stood  
6                   over it.  So, if you stood away from it and used  
7                   the pole, you were not line of sight.

8                   MEMBER BEACH:    Right.

9                   DR. ANIGSTEIN:    So, therefore --  
10                  what about the crane operator?  There wasn't any  
11                  crane operator at the time that the actual  
12                  radiograph was being taken, but what about the  
13                  crane operator passing back and forth when the  
14                  source was still in its well?  You get a narrow  
15                  beam going up.

16                  Again, its 500 millicuries, and the  
17                  crane operator will be about 20 feet up.  I'm  
18                  sure that he wouldn't be sitting there.  So, I'm  
19                  sure its not substantial.

20                  MEMBER BEACH:    How did they attach  
21                  the pole to the source?  Was it a -- was it a  
22                  magnet or?

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1 DR. ANIGSTEIN: No. The source  
2 itself was a little -- I can understand why the  
3 man took it home. It looked like something you  
4 could use for --

5 MEMBER BEACH: Yes, I saw the  
6 picture of it.

7 DR. ANIGSTEIN: A sinker. Yes, a  
8 little pointy end. But the string was always --  
9 its whoever supplied the source because the  
10 source was not owned by GSI. It was rented.  
11 For the reasons that Paul mentioned, you have to  
12 bleed off the helium. So, that's why they  
13 rented the source.

14 In the application to AEC, one  
15 reason they want to go to the cobalt is that its  
16 cheaper to buy it once. They pay for it once,  
17 and that's it. The radium is a continual  
18 expense for them.

19 So, the string would be -- it would  
20 come with a string attached, and the string  
21 would be hanging out of the -- of this big, lead  
22 shield, and then I wasn't quite clear whether

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1 the pole was always attached to it, or was the  
2 attachment. But it doesn't matter. They were  
3 out of the line of sight.

4 MEMBER BEACH: So, they didn't get  
5 their hands involved?

6 DR. ANIGSTEIN: No, no, no. There  
7 were aware of -- and they would just stick it  
8 onto the pole. Then they would take the pole,  
9 and hold it over the --

10 MEMBER BEACH: I read the  
11 description. I was just curious. You didn't say  
12 how it was attached to the pole.

13 DR. ANIGSTEIN: Yes, yes, but that  
14 really wouldn't matter.

15 MEMBER BEACH: Right.

16 DR. ANIGSTEIN: He did say that  
17 during the actual radiography, the pole was just  
18 left leaning and was left attached. The only  
19 thing is you can say, okay, you can put this  
20 hand on the lid to take the lid off, yes, there  
21 could be exposure to the hand.

22 MEMBER BEACH: So, how did he take

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1 the source home? Was there a description of  
2 that? Was it in his pocket, or?

3 DR. ANIGSTEIN: This is all hearsay,  
4 now.

5 MEMBER BEACH: Okay.

6 DR. ANIGSTEIN: The gentleman I  
7 interviewed said this happened in -- that's why  
8 he said the dates were significant. He left in  
9 September 53. He came back some time in 56, and  
10 he heard about this having happened during the  
11 period that he was not there.

12 MEMBER BEACH: Oh, okay.

13 DR. ANIGSTEIN: So, this was  
14 hearsay. Everyone who talked about it heard it  
15 from someone else.

16 CHAIRMAN ZIEMER: Well, it may or  
17 may not have been urban legend, but if you take  
18 radium sources home like that in your pocket,  
19 you're going to have immediate consequences.

20 DR. ANIGSTEIN: Exactly.

21 CHAIRMAN ZIEMER: Right.

22 DR. ANIGSTEIN: But what Mr.

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1 Ramspott actually found and dug up, and I  
2 followed up: There was a court case in  
3 Pennsylvania, in the federal court in  
4 Pennsylvania in 1944. It was a worker  
5 contesting the denial of a workman compensation  
6 claim. It was for General Steel Castings. It  
7 didn't say which facility.

8 I mean someone with access to legal  
9 records could probably dig that out, but we know  
10 there were at least two facilities in  
11 Pennsylvania. In 1944, there was only one. And  
12 he wanted workers compensation. And finally,  
13 the Workers Compensation Board said, You did it  
14 to yourself.

15 Then he wanted compensation for the  
16 scarring. And compensation is given only for  
17 physical scarring, meaning on your face and  
18 other places. He had scarring on his leg. So,  
19 you're entirely right. And this apparently  
20 happened -- either it happened more than once.  
21 As you say, an urban legend, it happened  
22 someplace else, at another time, and simply got

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1 transferred.

2 CHAIRMAN ZIEMER: Well, in any  
3 event, its pretty clear that radium wasn't  
4 regulated. And even after the AEC came into  
5 being, they did not regulate radium and  
6 byproduct material unless you had byproduct  
7 material onsite. Then the AEC included any  
8 other sources, such as radium, as part of the  
9 exposure limits.

10 So, you had to limit your exposures  
11 to regulated material, plus any other  
12 radioactive materials. So, radium was picked up  
13 that way, but that was after the AEC period.  
14 But you're quite right: it wouldn't have been  
15 regulated by AEC in those days, nor was there a  
16 state agency to regulate it.

17 This is true not only of  
18 radiographers in those days, but medical  
19 applications as well. I was not aware that  
20 people tried to bleed off the helium. The point  
21 I was making on the helium build up was that  
22 often led to leaking sources. So, radium

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1 sources became a source of external  
2 contamination very common in those kind of  
3 facilities for there to be leaking sources that  
4 contaminated the surfaces with radon daughter  
5 products as the radon gas leaked out of the  
6 source.

7 So, yes, they weren't subject to any  
8 legal dose limits. The only thing that was  
9 available for people at those times were the  
10 predecessor to NCRP had recommended limits.  
11 NCRP originally had named radium protection in  
12 there. I forget what it was, Jim, but something  
13 like National Committee on Radiation Protection,  
14 or Radium Protection, or something like that.

15 The other reason you would -- radium  
16 was very expensive in the early days. A gram of  
17 radium was like a fortune because of the process  
18 of separating radium out of the ore. So, the --  
19 a gram of radium in the early days was extremely  
20 expensive.

21 Some of the early stories of groups  
22 in the US when Madam Curie came to visit, and

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1 she was presented as like a gift a pile of  
2 radium you know, it's a big deal. It's like  
3 you're winning the Nobel Prize.

4

5 But no question about the regulatory  
6 issue. If you go back to the early days, you  
7 cant base it on any kind of limit. You have to  
8 base it on some assumptions about how it was  
9 handled.

10 DR. NETON: I was just looking  
11 through one of our documents. I remember that  
12 we do have data on industrial radiography going  
13 back to 1939. Not at GSI, of course, but it  
14 goes back to 39 through the 80s, and this was  
15 assembled by the EPA way back in 1984. That's  
16 the famous Kumazawa document, where we have  
17 geometric means and GSDs for radiography  
18 operations.

19 So, presumably there's more than one  
20 number. I mean it would generate -- if you  
21 actually read these off of the graphs. But the  
22 data are not terribly high. I mean there's

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1 four- tenths of a rem back in 39, dropping down  
2 to 0.25 up into the late 50s.

3 CHAIRMAN ZIEMER: These are based on  
4 what? People who were using film badges?

5 DR. NETON: Yes. Well, presumably,  
6 because I don't know how else they would've got  
7 the data. We have to go back and look at the --  
8 the -- where these data were derived from.

9 DR. MAURO: SC&A did that EPA in 84.

10 DR. NETON: This is a guy, Kumazawa  
11 I'm familiar with.

12 DR. MAURO: He did the same thing  
13 for EPA.

14 DR. NETON: Well, I don't know that  
15 he did this one. I remember this was a -- sort  
16 of a post doc from Japan that worked with the  
17 EPA that year, and he generated some very good  
18 distributions based on occupational type.

19 DR. MAURO: Okay.

20 DR. NETON: We have other  
21 industrial. We have industrial radiography and  
22 also -- well, anyway, but there are data out

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1       there.

2                   DR. MAURO:    I think its important  
3       data.

4                   DR. NETON:   Yes, which can give some  
5       indication as to whether -- what the magnitude  
6       of these exposures were.       Whether that's  
7       directly applicable to GSI would remain to be  
8       seen.    But there are -- someone must've been  
9       reporting these data.   That's why I'm saying.   I  
10      don't know why he would've been able to compile  
11      this without some state or some organization --

12                  DR. ANIGSTEIN:   Let me just retract  
13      one thing I said.   When I said they bled off  
14      helium, that was an assumption on my part.   I  
15      don't know whether they rented the radium.

16                  CHAIRMAN ZIEMER:   Yes.   To bleed it  
17      off, you somehow would have to open the source,  
18      which I don't think would be a very good idea,  
19      particularly in terms of the form the radium was  
20      in in those days.   I think it was --

21                  DR. ANIGSTEIN:   Radium chloride.

22                  CHAIRMAN ZIEMER:   Radium chloride,

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1 which is pretty messy to start with. Anyway, we  
2 need to take our lunch break. Try to be back  
3 at, lets say, 1:15. Lets resume at 1:15.

4 (Whereupon, the above-entitled  
5 matter went off the record at 12:07 p.m., and  
6 resumed at 1:16 p.m.)

7 MR. KATZ: And for the record, we  
8 have all three board members, Dr. Ziemer in the  
9 room.

10 MR. CHUROVICH: Dr. Ziemer?

11 CHAIRMAN ZIEMER: Yes, sir?

12 MR. CHUROVICH: This is Dan  
13 Churovich. I worked at General Steel Castings  
14 from 1951 to 1961, with some layoff periods in  
15 that.

16 CHAIRMAN ZIEMER: Okay.

17 MR. CHUROVICH: And I want to remind  
18 you you're talking about permits for a nuclear  
19 radioactive materials -- you got to remember  
20 you're dealing with the federal government, and  
21 they feel like they can do anything.

22 CHAIRMAN ZIEMER: Okay, yes. Thank

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1 you for that comment.

2 MR. CHUROVICH: And I know that I  
3 have seen a couple times, I guess, military  
4 personnel coming through the plant because we  
5 were working on tanks and stuff at that time.

6 CHAIRMAN ZIEMER: Yes, okay. Thank  
7 you. Were going to proceed. Just before lunch,  
8 we were talking about some issues that related  
9 to some matters on NIOSH's proposed Path  
10 Forward.

11 I want to make a general comment,  
12 and Ill put this in the framework of Dr.  
13 McKeel's plea that we move forward on General  
14 Steel Industries, and understand the concern  
15 there. I do think its important for us to come  
16 to closure in a timely fashion, if we can still  
17 talk about timely, because we've been dealing  
18 with this for a long time.

19 I think were at a point where we  
20 pretty much have identified the information  
21 that's going to be available. I know that we  
22 thought that was the case in earlier times, but

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1 additional information has -- has come forward.  
2 Much of it was identified with the petitioners  
3 efforts.

4 But in any event, it seems to me  
5 that were at the point where we've got to  
6 utilize what we have now, and try to make every  
7 effort to -- to bring the whole GSI matrix, as  
8 well as the petition, to a timely closure.

9 Now, that -- I think in fairness, we  
10 have to look at this information. We -- I do  
11 think its important to give NIOSH the  
12 opportunity to develop the Path Forward as they  
13 outlined it, or some version of that, and of  
14 course well need to take a look at that, and the  
15 contractor will have to help us.

16 I think its also important that we  
17 try to prioritize this, and I'll ask Ted if he  
18 can help us, realizing all of the other things  
19 going on that involve NIOSH and SC&A, and  
20 everybody's site is high priority to them.

21

22 MR. CHUROVICH: I've got one other

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1 thing I'd like to point out, and I've pointed  
2 this out many times. The people at the General  
3 Steel Castings, and employees that were working  
4 there, everybody is nosy and you have a tendency  
5 if something's going on, you want to find out  
6 what it is. But none of us knew of the danger  
7 of radioactive material. None of us.

8 CHAIRMAN ZIEMER: Well, we  
9 understand that, and were quite aware of that,  
10 but thank you for the reminder.

11 In any event, what I'm simply  
12 suggesting is to the extent possible that we try  
13 to move this along. I know that you outlined a  
14 fair amount of work here, Dave, that your staff  
15 will have to do. And in turn, well have to have  
16 the opportunity for the Work Group and the  
17 contractor to review that as well.

18 Hang on, please. So, I think we  
19 want to see if we can get on the priority list  
20 somewhere to have -- I don't know to what extent  
21 you can help with this, or Dave can help with  
22 this, or Jim, because I know there are many

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1 priorities. We've been dealing for quite some  
2 time with GSI, and I know that the frustration  
3 for the petitioner is to have it drag on and on.

4 So, to the extent that were able to,  
5 I would urge us to give what priority we can to  
6 try to come to closure on these issues. Because  
7 as I look at the Path Forward here, and I think  
8 John Mauro has already indicated that SC&A  
9 agrees that four of the sort of standard things  
10 -- these are -- as far as the SEC petition is  
11 concerned, these are tractable items that we can  
12 model, or use records and come to reasonable  
13 dose estimates, or reasonable bounding  
14 estimates.

15 That leaves us to deal with where  
16 the uncertainties are and the extent to which  
17 some of the unknowns may be unacceptable, and  
18 push us into a different position. But with  
19 that having been said, I do want to address a  
20 few more things in the first part of this, which  
21 had to do with the GSI matrix as it were, and  
22 the source terms and so on.

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1           We have sort of agreed as to the  
2           scope of the sources, and where the uncertainty  
3           on their presence are. I want to focus for a  
4           moment on the air activation issue. Hand on a  
5           minute. Bob, did you have a question on that?

6           DR. ANIGSTEIN:     No.     I have an  
7           answer.

8           CHAIRMAN ZIEMER:   Well, before you  
9           give us the answer, the air activation issue is  
10          mentioned on page 5, and there -- there are a  
11          number of questions. I would note that on -- on  
12          the two references that are on your list, and  
13          I've looked at them, in my mind, the Stevenson  
14          paper is not so applicable because everything  
15          that they used there was way up in the --  
16          energy- wise, way, way, way beyond what were  
17          talking about here.

18          They're up in the megavolt to  
19          gigavolt range with their accelerating hedrons  
20          and things like that. And so, the activation  
21          scenarios in the Stevenson paper I don't think  
22          are very applicable, beyond the general concept

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1 that you can activate air with ionizing  
2 particles.

3 The Harder paper is easier. I like  
4 that, don't you? The Harder paper is easier  
5 because it is more realistic for what were  
6 talking about here. And of course, this is not  
7 - - this is a paper that goes back almost 50  
8 years. Its -- air activation has been well-  
9 known, and the activation products pretty well-  
10 known. Dave, you have a little bit in here  
11 relating to the concentration limits for  
12 activated oxygen, activated nitrogen, which  
13 would be the principal products. They are  
14 both pretty short lived things. There's issues  
15 of -- of air mixing and so on that you haven't  
16 dealt with here because its -- that would be one  
17 of the things if you end up modeling this, it  
18 has to be considered. But Bob's got the answer.

19 What is the question?

20 DR. ANIGSTEIN: The air activation.  
21 We struggled with this, Dick Olsher and myself,  
22 our MCNP expert. How best to present the

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1 research. We looked at several approaches, and  
2 the final one we did was simply redid one of our  
3 original -- similar to one of our original  
4 betatron exposure scenarios, where the betatron  
5 is irradiating a large sheet of steel, a large,  
6 thick sheet of steel.

7 And to calculate is a little tricky,  
8 but you have to use this still developmental  
9 feature of MCNP, which is the delayed gamma  
10 because that was during the radiation comes from  
11 the betatron itself. You shut off the betatron,  
12 and so, you can model what happens with the  
13 decay of all the activated product as a function  
14 of time.

15 That was done in the original report  
16 that we prepared in early 2008. This was a  
17 repeat. So, we have the shot of the big steel  
18 sheet, six feet away. Heavy castings were done  
19 at six feet away. We interpreted six feet as  
20 being from the internal betatron target. Then  
21 we take the position of the worker. It could be  
22 one foot away. That was NIOSH's assumption.

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1 One foot away from the steel, or one meter away  
2 from the steel.

3 So, we modeled those two positions,  
4 starting five seconds after the betatron is shut  
5 off because you can't get there unless -- the  
6 worker cannot get from the control room to there  
7 in less than five seconds.

8 And then you stayed there for 15  
9 minutes, because that's what we were told.  
10 Typical set up time would be set up, take down.  
11 Okay, during this 15 minutes in the original --  
12 our original study, he gets various exposures  
13 from different sources.

14 So, for instance, what we call the  
15 long shot, the one-hour shot, where he is then  
16 in intervals of 15 minutes, in doing one shift,  
17 he'll get about 25 millirem mostly from this  
18 unexplained residual radiation from the betatron  
19 itself.

20 Of that 25 millirem, seven-tenths of  
21 a millirem, or mR -- I'm the one that's being  
22 incorrect on the mR. Not millirem. Seven-

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1 tenths of an mR is from the -- from the steel  
2 activation product. Now, we did it. So, then  
3 we ran it twice. We ran it with the normal air,  
4 and then we ran it in vacuum.

5 So, the only difference should be  
6 the air activation. Everything else should be  
7 the same. You can argue that slightly more beam  
8 hits the -- the target -- not the target, the  
9 steel, but the absorption of those high energy -  
10 - high energy cameras in six feet of air is less  
11 than a tenth of a percent.

12 The difference in the exposure,  
13 which we attribute to the air is 6 microR per  
14 shift. So, if you have 0.7 mR per shift from the  
15 steel, you get an additional 1 percent from the  
16 air. So, it's a --

17 CHAIRMAN ZIEMER: And your dose  
18 determination from air is based on infinite  
19 cloud of the air around the person, or just  
20 direct exposure from a slab? You're looking at  
21 an imaginary slab of air in front of the  
22 casting?

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1 DR. ANIGSTEIN: MCNP simply  
2 calculates the dose from the residual radiation.  
3 It's not in the model. It's a detailed  
4 calculation of each radioactive atom.

5 CHAIRMAN ZIEMER: But in fact, and  
6 you don't speak to this, Dave, but if you  
7 imagine a slab of air in front of the slab of  
8 steel, and you're presumably activating that  
9 air, that air is not sitting there like the  
10 steel.

11 DR. ANIGSTEIN: No, I know that, but  
12 this of course --

13 CHAIRMAN ZIEMER: It gives you an  
14 upper limit in the sense -- I'm sort of saying  
15 would you get the same result if you allowed  
16 that air to circulate, and you get the so-called  
17 infinite clouds? It can't be greater than --

18 DR. ANIGSTEIN: No. The point --  
19 the center line of the beam, and getting the --  
20 so, again, you're getting it by subtraction.

21 CHAIRMAN ZIEMER: And you used  
22 oxygen and nitrogen?

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1 DR. ANIGSTEIN: I used a complete --  
2 including trace amounts of xenon and helium and  
3 everything else.

4 CHAIRMAN ZIEMER: Okay, yes. Well,  
5 it appears it's not going to be an issue, but I  
6 think you would need to confirm that in whatever  
7 you do, Dave. I'm not sure how you guys are  
8 going to approach that. It sounds similar.

9 MR. ALLEN: Well, we -- I took the  
10 approach that, yes, if you model, it's going to  
11 be negligible. That's the approach we took  
12 prior to that.

13 CHAIRMAN ZIEMER: Yes.

14 MR. ALLEN: It seemed like it should  
15 be very small, but meanwhile we got that paper  
16 that said the concentration is up there a decent  
17 level. It doesn't seem to model out correctly,  
18 even if it's a small --

19 CHAIRMAN ZIEMER: Well, see, I can't  
20 tell from that. When they say concentrations,  
21 are they looking at the concentration in the  
22 immediate vicinity of where it's activated,

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1 where you take --

2 MR. ALLEN: I believe it was a  
3 sealed container in the center line of the beam.

4 CHAIRMAN ZIEMER: That's very  
5 different.

6 MR. ALLEN: Yes, it is.

7 CHAIRMAN ZIEMER: A very different  
8 animal.

9 MR. ALLEN: I'm not sure the MCNP is  
10 going to model that concentration, either. That  
11 was the issue I was having.

12 CHAIRMAN ZIEMER: Well, the sealed  
13 container would tell you what you could get in a  
14 defined volume of air. But in reality, in a  
15 real situation, you would in fact have to take  
16 that little volume, and it's going to exchange  
17 very rapidly. It's not going to sit there.  
18 Then you would in fact have the infinite cloud,  
19 which is going to take that value down, I would  
20 guess, many orders of magnitude.

21 MR. ALLEN: Yes.

22 CHAIRMAN ZIEMER: By a million or

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1 something.

2 MEMBER MUNN: Yes.

3 DR. ANIGSTEIN: One of our earlier  
4 tries was doing just that. It was taking a  
5 small pencil, like one square centimeter cross-  
6 section, and irradiating that, mostly because  
7 when you run the betatron model, you start off  
8 with the electrons hitting the platinum target,  
9 and generating the X-ray spectrum.

10 You run it. You go into very, very  
11 long runs on the computer and we have fast  
12 computers. So, we took a short cut by taking  
13 sort of the center of the spectrum and using the  
14 X-ray rather than the electron starting point.  
15 And we did that, and irradiated this little  
16 volume of air.

17 We calculated what -- we got MCNP to  
18 calculate what the N-13 and the O-15 was, and  
19 then we took that concentration, and we turned  
20 it into an infinite cloud.

21 CHAIRMAN ZIEMER: Okay.

22 DR. ANIGSTEIN: And we got doses off

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1 the charts. So, that was just not a good  
2 realistic model. We took the small -- that  
3 small amount. We got highly concentrated beams  
4 going through it.

5 CHAIRMAN ZIEMER: Right.

6 DR. ANIGSTEIN: So, we get the  
7 activation, and then we assumed that activation,  
8 that same concentration, now. We took that  
9 concentration and looked up the infinite cloud  
10 in --

11 CHAIRMAN ZIEMER: Oh, no, no, no.

12 MEMBER MUNN: That would never work.

13 CHAIRMAN ZIEMER: That's impossible.

14 That concentration and take that amount of  
15 activity --

16 DR. ANIGSTEIN: I understand.

17 CHAIRMAN ZIEMER: My thought on this  
18 is what you really want to do is find out what  
19 the equilibrium air concentration in that room  
20 is, and you can do that because you could  
21 calculate how many atoms of each thing are --  
22 are generated during the radiation of a certain

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1 size beam. Because at any moment, you have a  
2 certain volume of air under that beam.

3 DR. ANIGSTEIN: Right.

4 CHAIRMAN ZIEMER: So, I think you  
5 could do this. So, I would imagine a chunk of  
6 air, and just take an instant of Delta T, and  
7 Delta volume. Say, "What's that?" And you do  
8 integrate that over time, but then let that  
9 activity -- and it's -- because of the half  
10 life, that's going to -- there's going to be an  
11 equilibrium amount that the room would finally  
12 get, if you assume that the room -- distributes  
13 through the room that maybe doesn't even turn  
14 over. You'd get an upper limit.

15 DR. NETON: It seems to be easy for  
16 some of the diffusion of the --

17 CHAIRMAN ZIEMER: Yes.

18 (Simultaneous speaking.)

19 MR. ALLEN: At the same time you can  
20 only diffuse so far away from --.

21 MEMBER MUNN: It's a combination.

22 CHAIRMAN ZIEMER: Well, I don't want

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1 to make it too hard, but I think -- I think you  
2 can talk about what the maximum dose a person  
3 could get, and it's not going to be an internal  
4 dose with these half lives.

5 DR. ANIGSTEIN: This is done. This  
6 is already equilibrium. This already assumes  
7 that a betatron was running for 60 minutes, and  
8 60 minutes is six half lives of the nitrogen-13.

9 CHAIRMAN ZIEMER: Right.

10 DR. ANIGSTEIN: So, we're already  
11 essentially at equilibrium, and this is the  
12 dose. CHAIRMAN ZIEMER: Yes.

13 DR. ANIGSTEIN: So, this is the most  
14 the model -- in other words, you can't get more  
15 information out of this model.

16 DR. MAURO: Just so I understand.  
17 So, there's a box of air, right? What is it --

18 DR. ANIGSTEIN: This isn't the way  
19 to describe it.

20 DR. MAURO: You got a concentration.

21 DR. ANIGSTEIN: This model runs.  
22 You have a -- the betatron is here. The sheet

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1 of steel is here. We take a point right here  
2 along the center line, and say, "What is the  
3 photon flux of the delayed gammas at that  
4 point?"

5 DR. MAURO: Okay, okay.

6 DR. ANIGSTEIN: And you convert that  
7 into a dose.

8 DR. MAURO: Okay.

9 DR. ANIGSTEIN: That's the actual  
10 photon at that point of all the surrounding  
11 material, including the air.

12 DR. MAURO: Yes,

13 DR. ANIGSTEIN: And so, since you  
14 can't tell MCNP to only -- only the air and not  
15 the other things. So, we just did it twice.

16 DR. MAURO: Oh, so --

17 DR. ANIGSTEIN: With vacuum.  
18 Without vacuum.

19 DR. MAURO: With or without the air?

20 DR. ANIGSTEIN: And we got the  
21 difference.

22 CHAIRMAN ZIEMER: So, the difference

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1 is due to the air. But I'm saying, "Okay, if  
2 you know that, if you want to really know" --  
3 and momentarily, that will expose somebody back,  
4 but if you're continuing to do that --

5 DR. ANIGSTEIN: But this is not  
6 momentarily. This is, first of all, it's  
7 assumed 60 minutes of exposure.

8 CHAIRMAN ZIEMER: All right.

9 DR. ANIGSTEIN: And then it's  
10 integrated over 15 minutes, starting five  
11 seconds after the exposure.

12 CHAIRMAN ZIEMER: All right, all  
13 right. But all I'm saying is that suppose  
14 you're going for 60 minutes, or whatever it is.

15 The person hasn't even come into the room yet.  
16 That air, by the time that person comes in, is  
17 in the room. It's all over. You have an  
18 infinite cloud of something.

19 DR. ANIGSTEIN: Yes.

20 CHAIRMAN ZIEMER: And it's that  
21 source -- hang on. And so, it's that source-  
22 term that is I think distributed in the -- and

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1 then the person can come into that.

2 DR. ANIGSTEIN: Yes, but  
3 distributing it throughout the room is not going  
4 to increase your dose rate.

5 CHAIRMAN ZIEMER: No. That's  
6 exactly my point. That's my point.

7 DR. ANIGSTEIN: But we already have  
8 a tiny dose rate. So, why bother trying to get  
9 --

10 CHAIRMAN ZIEMER: Well, that may be  
11 the case, but I think the only point that --  
12 there's two points. One is, the petitioner  
13 point, is have you considered air dose? And you  
14 have to discuss that. And then you have to sort  
15 of say, "How are you doing it?" So, I don't  
16 know what -- we're just giving some thoughts on  
17 how one might approach it.

18 DR. ANIGSTEIN: Air dose unknowingly  
19 was built into our original calculation because  
20 the air was always there. We always had air, we  
21 just didn't pay much attention to it.

22 CHAIRMAN ZIEMER: Yes.

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1 DR. ANIGSTEIN: Because the question  
2 was raised, we put the room under vacuum.

3 DR. MAURO: This is my  
4 understanding.

5 CHAIRMAN ZIEMER: Oh, you mean the  
6 MCNP --

7 DR. MAURO: That is where I was  
8 headed with this. So, when you say you ran  
9 MCNP, whatever the setting was, part of the  
10 calculation was that there were these  
11 interactions with air.

12 CHAIRMAN ZIEMER: With oxygen.

13 DR. MAURO: Throughout. And what I  
14 understand is throughout the entire room.

15 DR. ANIGSTEIN: Well, except that  
16 the beam --

17 DR. MAURO: Where are the beams  
18 going?

19 DR. ANIGSTEIN: The beam focuses on  
20 this sheet of steel.

21 DR. MAURO: So, there's a boundary  
22 there.

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1 DR. ANIGSTEIN: Yes. It's  
2 scattered, but --

3 DR. MAURO: So, right now, you  
4 probably could tell me that the way in which  
5 works is the air does contain some envelope of  
6 some size is what is --

7 DR. ANIGSTEIN: Well, the beam has a  
8 penumbra. It doesn't have any --

9 DR. MAURO: Good. Keep going.

10 DR. ANIGSTEIN: So all the air  
11 that's hit by the beam.

12 DR. MAURO: And which -- do we have  
13 any idea what that is?

14 DR. ANIGSTEIN: You don't have to  
15 know.

16 DR. MAURO: So, that's all that  
17 matters? Is that the only place you're going to  
18 get it?

19 DR. ANIGSTEIN: But the point is the  
20 interactions only happen where you have the X-  
21 ray beam.

22 DR. MAURO: Got it, okay. And what

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1 you're saying is at the end of so many seconds,  
2 this is -- this is the total dose, with or  
3 without the presence of the air.

4 DR. ANIGSTEIN: This is the  
5 integrated 15-minute dose.

6 DR. MAURO: All right, I got it.

7 MEMBER MUNN: And the point is five  
8 seconds after the air is there, that air is not  
9 there.

10 DR. MAURO: It's not there, and he's  
11 keeping it there.

12 MEMBER MUNN: Yes.

13 DR. ANIGSTEIN: Yes, but I -- we  
14 don't have any air movement.

15 DR. MAURO: What I'm hearing from  
16 Bob, and Bob, please correct me if I'm wrong,  
17 the problem is solved.

18 DR. ANIGSTEIN: Yes.

19 DR. MAURO: And the dose is  
20 insignificant?

21 DR. ANIGSTEIN: Yes.

22 DR. MAURO: Unless I'm

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1       misunderstanding --

2                   CHAIRMAN ZIEMER:     The point is in  
3       the documentation where you show you've  
4       considered all sources, you're going to have to  
5       point out --

6                   MR. ALLEN:     Discuss this.     I was  
7       going to point out it's -- these two give off  
8       annihilation photons, 511 keV.     So, it is  
9       detectable with the film badges, to reconcile  
10      with the film badges.

11                   CHAIRMAN ZIEMER:     Right.

12                   DR. MCKEEL:     Dr. Ziemer, this is Dan  
13      McKeel.     May I speak?

14                   CHAIRMAN ZIEMER:     Sure.

15                   DR. MCKEEL:     My comment is really  
16      about process rather than about details,  
17      methodology, and I did want to put this on the  
18      record.     I am very confused about this last  
19      discussion for the last 15 minutes.

20                   My original question really was has  
21      NIOSH modeled air activation?     And I was trying  
22      to be polite because it didn't seem to me that

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1 they had. And unless I misunderstand the entire  
2 process that we're about, it really is NIOSH's  
3 job to model the source terms at GSI, and then  
4 it is SC&A's role to advise the Board about how  
5 that was done; whether that was sufficient to  
6 plausibly bound that source-term, et cetera.

7           What I hear going on now is there  
8 was -- there was no indication that NIOSH  
9 actually did the air activation modeling. And I  
10 must tell you the very first time I ever -- I  
11 was referred by a current Board Member, back  
12 before he was a Board Member, to a fellow at the  
13 University of California at Berkeley, who was  
14 knowledgeable about accelerators.

15           The very first words out of this  
16 guy's mouth was -- we were talking about air  
17 activation, and he said, "Oh, yes." He said,  
18 "The first recollection I have of being at  
19 Berkeley was smelling the activated air after a  
20 linear accelerator run."

21           And so, as Dr. Ziemer said, this has  
22 been known for 50 years. And I would think that

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1 this was physics 101 of accelerators to know  
2 that there was air activation, and to model the  
3 dose. And what I hear happening is, and I don't  
4 understand this at all, I have to say I'm still  
5 trying to be polite, but I think it's improper  
6 that SC&A did the modeling, and the air  
7 activation, and I hear Dr. Anigstein defending  
8 their calculations, when in fact I don't think  
9 they should've been doing that at all.

10

11 I think they should've been reacting  
12 and advising the Board on a technical capacity  
13 on what NIOSH did. And you know it's the same  
14 issue as the radon model at Blockson, which is  
15 now got to be re-figured.

16 I don't think it's up to SC&A to  
17 develop a new model for anything. I think -- I  
18 just don't think that's their role. So, I  
19 needed to get that comment on the record.

20 CHAIRMAN ZIEMER: Dan, you're  
21 actually preaching my sermon, which I do over  
22 and over again, and we know, and that's why I'm

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1 saying that NIOSH has to speak to the issue. I  
2 believe what happened here, and we -- we the  
3 Board don't have anything official from SC&A on  
4 this.

5 I think Bob has looked into this in  
6 preparation of this meeting, partially to  
7 prepare himself for discussion. So, we don't  
8 have anything official from SC&A on this beyond  
9 what you just heard.

10 Now, the other comment I'm going to  
11 make is about the smelling of the -- the air.  
12 What they're talking about there is ozone.

13 DR. MCKEEL: Right. I understand  
14 that.

15 CHAIRMAN ZIEMER: And that is what  
16 you get for any high energy source is you get  
17 ozone, which is a -- what I would call a -- as  
18 opposed to an activation product, that's a  
19 chemical reaction. It's an excitation reaction,  
20 really, of oxygen, rather than an ionization.

21 DR. MCKEEL: I understand that, but  
22 you know that is super technical. It's all part

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1 of the same process together.

2 CHAIRMAN ZIEMER: The presence of  
3 ozone does not indicate activation of air.  
4 Actually, you -- most gamma --

5 DR. MCKEEL: Don't they occur  
6 simultaneously on an accelerated run?

7 CHAIRMAN ZIEMER: Well, they may in  
8 a high energy accelerator like we're talking  
9 about here. But you'll get ozone with cobalt  
10 irradiators as well.

11 DR. MCKEEL: Okay.

12 CHAIRMAN ZIEMER: But the smell  
13 issue really indicates the presence of ozone,  
14 which may --

15 DR. MCKEEL: The point I'm trying to  
16 make is that a betatron, which operated nearly  
17 continuously around the clock for 24 hours at  
18 GSI generated -- I don't know about the ozone.  
19 Nobody has measured that, but it's bound to have  
20 activated a lot of air.

21 CHAIRMAN ZIEMER: Yes.

22 DR. MCKEEL: And it was that simple

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1 process that I was trying to get at.

2 CHAIRMAN ZIEMER: And you made the  
3 point, and we're simply asking NIOSH, as part of  
4 their consideration of these issues, to be sure  
5 to address air activation.

6 DR. MCKEEL: Okay.

7 CHAIRMAN ZIEMER: It will be their  
8 call as to how they address it. I think Bob was  
9 telling us how he was looking at it, but that's  
10 not a model.

11 DR. MCKEEL: That's fine. That's  
12 fine. Thank you.

13 CHAIRMAN ZIEMER: We haven't asked  
14 NIOSH to use --

15 DR. MAURO: Yes. Let me -- SC&A  
16 finds itself in an unusual position very often.

17 When we're asked to look into a particular  
18 matter, whether it's -- do you think that the  
19 radon concentrations at Blockson as 2.3  
20 picocuries per liter, that was the originally  
21 number of it, it looked like a good number  
22 because they based it on some source?

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1                   Or, what we're talking about her:  
2                   air activation came up. Do you think that could  
3                   be an issue? And we were asked to look into it.  
4                   Then we find ourselves into a very funny  
5                   position.

6  
7                   Let's look into it. And the purpose  
8                   of looking into it -- what's involved, and what  
9                   magnitude of potential exposure can it be? And  
10                  is that compatible with the kinds of numbers  
11                  that NIOSH is coming up with.

12                  Well, low and behold, what happens  
13                  is we end up coming up with an answer. Now,  
14                  what we try to do when we come up with these  
15                  answers -- now, this is not the answer. This is  
16                  an answer. Bob keeps -- Bob is the one who  
17                  points this out to me, so I'm just going to --  
18                  what he's saying is, "I'm coming up with an  
19                  answer that explores this issue, and whether or  
20                  not it's possibly significant."

21                  Now, here we are sitting around a  
22                  table, and what we ended up saying out loud here

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1 at the meeting is, "Well, we looked into the  
2 issue. Bob looked into the issue, and he came  
3 up with an answer to try to come at this problem  
4 of whether or not it's important. The bottom  
5 line is, it sounds like it's not important."

6 Now, I could truly sympathize with  
7 Dr. McKeel. You know, is SC&A doing NIOSH's  
8 work here? And the reality is we're not  
9 supposed to be doing NIOSH's work, but in a  
10 funny sort of way, it falls out of the process.

11 MR. KATZ: Let me speak to this.

12 DR. MAURO: Yes, help me out.

13 MR. KATZ: Let me speak to this,  
14 because I actually do not think there's anything  
15 improper about what's going on here. I think  
16 it's actually perfectly proper.

17 DCAS goes about and does its work,  
18 and comes up with a proposal for how it's going  
19 to do dose reconstruction, or it comes up with  
20 an evaluation of an SEC petition, and it  
21 examines the issues that it considers are  
22 important, and it produces then a methodology.

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1 That then gets peer reviewed by the Board with  
2 SC&A's technical support.

3 SC&A and the Board can question  
4 every aspect of DCAS's methodology. And they  
5 may want to bore into some issues that -- that  
6 DCAS may have made a judgment, "There's no value  
7 here in going deeper on this issue." They may  
8 also catch some issues where DCAS didn't  
9 consider it. But that is all proper peer  
10 review. It's totally appropriate.

11 I have no level of discomfort about  
12 you doing that, about you doing modeling to sort  
13 of support your bases for making assertions  
14 about the strength or weakness of a methodology.

15 That's all good work, and it should be going  
16 on. Then what happens that sometimes gets to be  
17 a little bit uncomfortable, but it's -- I still  
18 think it's all perfectly appropriate: in certain  
19 circumstances, SC&A, and we just talked about  
20 one example in the past, SC&A will dig into an  
21 issue, produce some modeling. But it's all to  
22 bear up it's position, and then everybody will

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1 look around at that and say, "Well, this is  
2 actually good methodology. This is what  
3 should've been applied in this case, and it'll  
4 get applied."

5 And again, the whole point of this  
6 whole process is, one, to get to the point where  
7 the science being used in every dose  
8 reconstruction is as good as possible, and two,  
9 in cases where the petition to get to the right  
10 answer as to whether dose reconstruction is  
11 feasible or not.

12 That is the purpose of this whole  
13 process. And if, at times, the Board is  
14 thinking, or SC&A is thinking, and it has in  
15 many times contributed to the quality of the  
16 dose reconstruction or the quality answer to the  
17 SEC petition, that is all to me perfectly  
18 appropriate. I don't think there should be any  
19 feeling of discomfort for these contributions  
20 that you make.

21 I mean I can sympathize with Ed, and  
22 Dan is not the only petitioner. There are other

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1 petitioners that feel like, "Well, we really  
2 just want an outcome for our petition."

3 DR. MCKEEL: No, I don't feel that  
4 way. That's a misrepresentation of the way I  
5 feel. So, you speak the way you feel about it,  
6 and then I need to speak.

7 MR. KATZ: Okay. That's fine. I'm  
8 not trying to represent you, Dan.

9 DR. MCKEEL: Good.

10 MR. KATZ: I have heard --

11 DR. MCKEEL: Don't do that. Okay,  
12 thank you.

13 MR. KATZ: I don't need more  
14 castigation, please, Dan. There are petitioners  
15 who feel very frustrated that all of a sudden  
16 everyone is working to improve the science of  
17 the product. Some petitioners feel like really  
18 their petition should've been judged on the  
19 original science that existed, the original  
20 merits; if the science doesn't match up with --  
21 with the question as to whether a dose  
22 reconstruction is feasible at that time with

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1 that methodology. Then somehow, the process is  
2 flawed. And what I'm saying in this case is I  
3 don't think that's the right way to think about  
4 it because there is this whole, quite elaborate  
5 peer review process that's integral to how this  
6 work gets done.

7 DR. MCKEEL: All right, well, my  
8 comment in follow up is I appreciate what you  
9 said. I would note to you, however, that I also  
10 was on peer review groups for the entire time,  
11 the entire 31 years, that I was at Washington U  
12 as a professor in the pathology department.

13 So, I'm very familiar with that.  
14 But I will also say that as far as I understand  
15 peer review, one person presents a finding or  
16 grant, or a hypothesis, and then the peer  
17 reviewer takes that hypothesis and evaluates it.

18 And that is all perfectly proper.

19 And if, in the evaluation, you come  
20 up with a new idea or new method, that's  
21 perfectly okay that that be used. That's one  
22 way science advances. I agree with that.

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1           What has not been accurately  
2 represented was I didn't think that NIOSH had  
3 modeled air activation at all. I thought it had  
4 overlooked that, and that that was a legitimate  
5 source-term, albeit -- however it turns out. I  
6 don't know that, whether it' a large factor.

7           But to say that it's a factor and it  
8 produces measurable radiation, but that's not  
9 important, I would quibble with that scientific  
10 evaluation. However, what I was really getting  
11 at was NIOSH didn't model it. So, there was no  
12 peer review.

13           The only peer review, it seemed to  
14 me, that was necessary was to say, a long time  
15 ago, "NIOSH, could you please model air  
16 activation? It's a legitimate source-term with  
17 an accelerator operating in the MeV range. And  
18 I still think that's true.

19           The other comment is I don't think  
20 it's fair about which particular references I  
21 submitted about air activation. The point I was  
22 trying to get out is that there is a huge

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1 voluminous literature on this, and by this time,  
2 ten years into the program, to me, there are  
3 lots of things that activate air.

4           It just seemed to me that that was  
5 something that NIOSH should've addressed, still  
6 should address. But to me, two-and-a-half years  
7 after Appendix BB, and not quite as long for the  
8 SEC, it seems to me it should've already been  
9 addressed. And what I'm objecting to honestly  
10 after this is the prolongation of this process,  
11 another couple of years, to allow that to occur.

12           So, I actually agree with everything  
13 Ted said, given the fact that there's a  
14 legitimate proposal from NIOSH on the table, and  
15 then SC&A is reacting to it. I don't think that  
16 was the case in this situation. So, that's my  
17 comment about it.

18           CHAIRMAN ZIEMER: Okay. Thanks,  
19 Dan.           DR. MCKEEL: Thank you.

20           CHAIRMAN ZIEMER: Actually, what we  
21 do have on the table as part of the Path Forward  
22 that says that under the -- on page one, that

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1 activation of air by betatron operation would be  
2 considered as a source-term, and then on page 5,  
3 some sentences about how they would move forward  
4 on the air activation issue.

5 As I said earlier, I think that SC&A  
6 was aware that this was on for discussion at  
7 this meeting, and in preparing themselves  
8 actually looked at that, in I'd say, much the  
9 manner that Ted has described. We have not --  
10 we have not charged them with doing the modeling  
11 for NIOSH, and I think NIOSH is free to proceed  
12 here. But at least an early sort of evaluation  
13 of how they understand that is contributing.

14 So, let's leave it at that as far as  
15 air activation is concerned. I did want to ask  
16 one other question, and we may have -- and I  
17 don't want to prolong this part, but on the 15-  
18 minute -- well, the 15 mR field that is faded  
19 away, and maybe it was in 15 minutes or ten  
20 minutes. We had a number of scenarios we were  
21 kind of looking at to see how this could occur.

22 Did we look at the possibility that

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1 that might've been an EMF field? Because many  
2 radiation instruments respond, or their  
3 electronics to respond to EMF fields. And could  
4 it have been a dying EMF field that has affected  
5 the reader?

6 MR. ALLEN: I brought that up as a  
7 possibility at another Work Group meeting.

8 CHAIRMAN ZIEMER: Was that ruled  
9 out?

10 DR. ANIGSTEIN: Well, let me just  
11 tell you what it measured. This was measured  
12 with a Victoreen ionization chamber. So, I  
13 don't know whether an EMF field can cause a  
14 charge on an ionization chamber.

15 CHAIRMAN ZIEMER: Well, it doesn't  
16 necessarily cause a charge on the ionization  
17 chamber. What the EMF field can do is affect  
18 the electronic circuitry.

19 DR. ANIGSTEIN: But the ionization  
20 chamber is just --

21 CHAIRMAN ZIEMER: You have to read  
22 it out.

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1 DR. ANIGSTEIN: Just a capacitor.

2 CHAIRMAN ZIEMER: Yes.

3 DR. ANIGSTEIN: And then it gets  
4 read out, but that's later.

5 MR. ALLEN: It can induce a current  
6 in the electronics, in the wiring, et cetera.

7 DR. ANIGSTEIN: That you get a wrong  
8 reading on the ionization chamber?

9 MR. ALLEN: The meter might indicate  
10 something --

11 CHAIRMAN ZIEMER: He's saying that  
12 it's a separate --

13 DR. ANIGSTEIN: It isolates. It's  
14 very simply. I'm trying to be diplomatic about  
15 this. This came out of a recollection. I think  
16 we can mention his name because he was a NIOSH  
17 contractor. He wrote up a report under NIOSH.  
18 It was Jack Schultz who was still -- still  
19 services the remaining betatrons--there are two  
20 of them I believe now left in operation--under an  
21 independent business.

22 The way he described this to me in a

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1 telephone interview, and I have documented this,  
2 is that he took the -- the reason he took the  
3 measurement is that he was warned, and it was a  
4 common warning, "Stay away from the betatron  
5 after it's shut off because it's -- you're going  
6 to get a radiation dose."

7 And he wanted to -- and he was  
8 impatient with this because he wanted to work.  
9 So, he decided to measure how much -- what kind  
10 of radiation field there was there, so he would  
11 know for his own personal safety when it was  
12 okay to get off this.

13 So, he said he had the -- everything  
14 set up, and I believe he put the -- I believe  
15 the betatron manual, instructions manual says  
16 the ordinary Victoreen chamber doesn't have a  
17 thick enough wall so that you would get  
18 electronic equilibrium.

19 So, he puts a big, big Lucite two-  
20 and-a-half inch, I think if I remember  
21 correctly, like a Lucite rod with a hole drilled  
22 in it. So, he said he had everything sitting

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1 off to the side, everything ready. And then as  
2 soon as the moment it was shut off, he rushed  
3 into the room, put the thing in place, and took  
4 a reading.

5           Apparently, he must've taken several  
6 readings, and he said he found 15 mR at the  
7 earliest that he could get to the betatron. And  
8 that after 15 minutes, it was essentially zero.

9       This is based on his recollection. He had no  
10 notebooks. He had no written records. This is  
11 a recollection of an experiment done many years  
12 later that was never documented.

13           Nobody, neither NIOSH not SC&A -- we  
14 stood on our heads -- we could not figure out  
15 where this came from.

16           CHAIRMAN ZIEMER: Well, I couldn't  
17 remember if we had talked about EMF's, but if  
18 he's using an isolated --

19           DR. MAURO: It's not there.

20           CHAIRMAN ZIEMER: I thought maybe he  
21 was using a Cutie Pie or --

22           MR. ALLEN: Well, are you sure we're

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1 not confusing it? They used a different method  
2 in their calibrating in that high intensity  
3 field. But for this particular one, he said he  
4 used a gamma -- an ionization gamma survey meter  
5 model 247A.

6 DR. ANIGSTEIN: I'm sorry, David.  
7 You are right because this is different. I am  
8 sorry.

9 CHAIRMAN ZIEMER: Okay, using a  
10 survey meter in my --

11 DR. ANIGSTEIN: Yes, yes, yes.  
12 forget what I said.

13 CHAIRMAN ZIEMER: But we can't -- we  
14 can't --

15 MR. ALLEN: It's nothing you are  
16 going to quantify --

17 CHAIRMAN ZIEMER: There's just no  
18 way to know that. It just occurred to me it  
19 might've been an EMF field. But in the absence  
20 of knowing that it was, we have to assume it was  
21 real.

22 Okay, so, what -- what we have here

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1 are a number of items that will represent a new  
2 or revised source-term analysis. I guess you  
3 have to say to deal with the matrix issue of  
4 Appendix BB.

5 Now, under -- starting on page 6,  
6 issues raised for Appendix BB and the Evaluation  
7 Report, which is the petitioner Evaluation  
8 Report. The Chairman of the Work Group asked  
9 NIOSH to review and update issues 3 through 11.  
10

11 Issues 4 through 11 are addressed by  
12 the Path Forward, as summarized later in the  
13 section. Issue 3 is not. Issue 3 pertains to  
14 output of the betatron. Appendix assumed an  
15 output of 100 R per minute per the transcripts  
16 of the Work Group meetings. SC&A review pointed  
17 out that the value of 250 R per minute would be  
18 more consistent with the written statements from  
19 former employee. That statement is given here.

20 So, anyway, I guess on issue 3, you  
21 have a specific proposal, and that's to use 100  
22 R per minute for the old betatron, and 250 for

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1 the new.

2 MR. ALLEN: Yes, that dose seems to  
3 be consistent with all the statements we got,  
4 including from this Allis-Chalmers employee.

5 CHAIRMAN ZIEMER: And that's sort of  
6 a specific thing, and I guess we need to -- I  
7 don't know, SC&A, if you have looked at this  
8 since you've seen this.

9 DR. ANIGSTEIN: Actually, I would  
10 disagree in the other direction. Only in that  
11 the 250 for radiography, the betatron had a beam  
12 flattening. What they called -- it was shaped  
13 as a curve. Actually, it looked like a Gaussian  
14 curve, the cross section of aluminum. So that  
15 to filter out the beam center and the 250 R per  
16 hour would be -- and it can easily be removed  
17 for calibration.

18 But the 250 R per hour was our  
19 assumption of what the beam was with no cone in  
20 place. With the cone in place, it cuts it down  
21 to about 65 percent. So, 160 seems like a  
22 reasonable number for the new betatron. And as

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1 a matter of fact, this was my -- one of the  
2 radiographers who was on the phone, I don't know  
3 if he's still there, said the yield then was  
4 160, being the right number.

5 CHAIRMAN ZIEMER: Okay, let me  
6 clarify. For the early one, you're okay with  
7 100?

8 DR. ANIGSTEIN: And for the early  
9 one --

10 CHAIRMAN ZIEMER: Or would it be  
11 lower also?

12 DR. ANIGSTEIN: I would guess 100.  
13 I think we were told it was 100. So, 100 is  
14 okay. I did a calculation assuming the same  
15 beam current and I got higher. But 100 should  
16 be -- I think it's fine.

17 MR. ALLEN: Yes, I didn't specify  
18 there, and I should've. I was intending to mean  
19 uncompensated, the rated output or whatever,  
20 which I believe you're saying on the 250. Are  
21 we in agreement?

22 DR. ANIGSTEIN: Yes, we're in

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1 agreement with that. The other one, just to  
2 make a small point, the history of it is that  
3 betatron was installed in early 1952, at about  
4 the same time that the new -- actually it was  
5 produced in November 1951, and the installation  
6 was new to Granite City. And when they brought  
7 it over, it probably made -- it must've made a  
8 side trip to Allis-Chalmers or maybe Allis-  
9 Chalmers came on board because they upgrade it  
10 from 22 MeV to 25 MeV, and also improved the  
11 circuitry and capacitors and everything else to  
12 give it a higher output.

13 At the same time, they refurbished  
14 the old betatron, and raised it from 22 to 24  
15 MeV. So, I don't know the 100 R per hour was  
16 during the 200 MeV period, or the 24 MeV period.

17 My guess -- I would guess that the 100 R would  
18 probably be a good number for 1962 through 1963,  
19 and that later it was somewhere between 100 and  
20 160 after it was boosted.

21 But I also think that for purposes  
22 of -- that we would use the limiting exposure,

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1 the new betatron, and so that's a little  
2 academic.

3 MR. ALLEN: Well, I'm thinking along  
4 the same lines.

5 CHAIRMAN ZIEMER: You would use the  
6 250, but then in your model, you would use the  
7 flattening filter?

8 MR. ALLEN: Yes.

9 CHAIRMAN ZIEMER: Or use 250 as it  
10 is?

11 MR. ALLEN: 250 uncompensated, which  
12 as Bob pointed out, is about a third less than  
13 the actual measurements.

14 DR. ANIGSTEIN: Yes.

15 MR. ALLEN: And there is -- I don't  
16 know if we have any information about the new --  
17 that the old betatron was upgraded, but it's  
18 very possible. Bob said it's probably a moot  
19 point. So, you can assume 250 after 1960 or  
20 after the new betatron was built, and both of  
21 them.

22 CHAIRMAN ZIEMER: So, you're going

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1 to use 250 for both?

2 MR. ALLEN: After the new betatron  
3 is built, and 100 prior to that.

4 CHAIRMAN ZIEMER: Right, and 100  
5 prior to that time.

6 DR. ANIGSTEIN: Was the 100  
7 compensated, I hope.

8 MR. ALLEN: Well, they seem to be --  
9 the operators seem to be stating the operating  
10 voltage --

11 DR. ANIGSTEIN: But the operators  
12 only know the compensated formula. They  
13 wouldn't be the ones --

14 MR. ALLEN: I don't know if they  
15 actually measured. I was thinking they would  
16 know the rated output because they did say 250.

17 DR. ANIGSTEIN: Yes, the rated  
18 output was with the compensator -- okay, if it  
19 was more, I'm not sure. I'll have to look at  
20 that.

21 MEMBER MUNN: Well, in any case, the  
22 250 would be --

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1 DR. ANIGSTEIN: The limiting one.

2 CHAIRMAN ZIEMER: Yes, for the later  
3 years.

4 DR. ANIGSTEIN: No. Actually, just  
5 one second. The same person who said it was 160  
6 for the new said it was 100 for the old. So, he  
7 must've been talking of the same conditions.

8 MR. ALLEN: Okay, I'll find that,  
9 and set it up and reference that for the output.

10 CHAIRMAN ZIEMER: Okay, let's go on  
11 then. I think that issue will end up being  
12 easily closed at the time with the right  
13 numbers. So, we don't need to debate it here.

14 Issue 4, SC&A disagreed with the  
15 modeled results, NIOSH not including neutron.  
16 Well, that's the issue that, as Dave was saying,  
17 the Path Forward will take into account neutron  
18 exposure. And that's all he would say on that,  
19 but he'll include that. So, I don't know if  
20 there's any further discussion on that at this  
21 point.

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

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1       McKeel. Can I make a comment, please?

2                   CHAIRMAN ZIEMER: Certainly may.

3                   DR. MCKEEL: My comment is I don't  
4 understand that will be considered for neutrons,  
5 when we have had extensive discussions in this  
6 Work Group, where NIOSH claimed on the record  
7 that they already had photon to neutron ratios  
8 for GSI.

9                   So, I'm just flabbergasted that all  
10 these efforts appear to be brand new efforts to  
11 calculate neutrons, and we're talking about the  
12 same two betatrons, and we know that neutrons  
13 were 15 percent of the beam output, energetic  
14 output, and we've known that for an awfully long  
15 time.

16                   So, I just don't understand. When  
17 you read this document, it sounds like somebody  
18 challenged NIOSH, which they did, and most of  
19 the time it was SC&A. Our challenges are not  
20 very well documented in that paper, as on the  
21 Path Forward. But in any case, it sounds like  
22 we're just going to start all over again.

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1           And I have detailed records where I  
2           was responded to, by saying that NIOSH had  
3           neutron data, and it was photon to neutron data  
4           developed on information that SC&A developed  
5           again.

6           So, I'm just asking a general  
7           question. I'm surprised that the Work Group is  
8           not surprised when NIOSH says, "We will now go  
9           about getting neutron data." And at this late  
10          date, how would they go about doing that if  
11          that's a legitimate thing that will be done?

12          If they haven't been able to do it  
13          to this time, and there's no neutron data  
14          they'll stand behind, how do they go about doing  
15          it in the future?

16                   CHAIRMAN ZIEMER: Dave will speak to  
17          that.

18                   MR. ALLEN: Yes, there's nothing  
19          there that says we're going to go out and get  
20          neutron data. And the background of that is  
21          that for part of the ER, we mentioned that we  
22          were looking at the models that SC&A put

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1 together with the neutron dose, combined with  
2 the film badge data, and adjusting those models  
3 to the match up with the film badge data.

4 We wrote up a White Paper on that,  
5 provided it to the Work Group. It's been some  
6 time ago, and that was the neutron to photon  
7 study essentially, or White Paper, whatever you  
8 want to call it, that we mention in the ER.

9 That was met with some resistance  
10 because there was various scenarios that might  
11 not have been accounted for, et cetera, et  
12 cetera, but that is a similar concept to what  
13 we're talking about here. And this entire Path  
14 Forward, many of these concepts have been  
15 discussed throughout the Work Group meetings,  
16 and this is just an attempt to pull it all  
17 together.

18 The work that was done in the past  
19 won't be thrown out and started over. We're  
20 going to grab everything we can, adjust what  
21 needs to be adjusted based on what's come to  
22 light since that time, and start pulling it all

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1 together into one hopefully coherent document.

2 CHAIRMAN ZIEMER: Well, I assume  
3 that you're modeling approach should be the  
4 same, but if there -- if you -- you're basically  
5 taking the photon values, and you're using a  
6 ratio to get the neutrons. I assume what you're  
7 saying is if you end up with different photon  
8 values, you'll obviously adjust the neutrons.  
9 You're not reinventing the approach on neutrons.

10 MR. ALLEN: No. The only evidence  
11 of neutrons is the physics behind the situation,  
12 and we're modeling the photons. You model the  
13 neutrons along with it.

14 CHAIRMAN ZIEMER: Right.

15 MR. ALLEN: And we have measurements  
16 for photons. So, then you use a ratio --

17 CHAIRMAN ZIEMER: Right. That was  
18 discussed earlier in some depth.

19 DR. ANIGSTEIN: The problem with  
20 that approach is our MCNP model separately  
21 produced the description of neutrons and  
22 photons. Now, NIOSH may disagree with some of

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1 the geometry assumptions, and also they have the  
2 film badges. So, there may be some revision  
3 possible, different assumptions of the photon  
4 doses.

5 But to say then that we will take  
6 this, shall we say reduced, perhaps reduced  
7 photon -- they will accept our, the SC&A,  
8 neutron and photon calculations. Then they will  
9 say we divide one by the other and get a ratio.

10 Then you say, "Well, we're now going  
11 to do our own photon evaluation, but we will use  
12 the SC&A neutron to photon ratio to get  
13 neutrons." I don't -- that's not necessarily  
14 valid because the same -- it's not proportional.

15 We're not just talking about saying, "We're  
16 going to change the work week, and therefore,  
17 everything's scaled linearly."

18 We're talking about changing the  
19 model, changing the geometry, which may result  
20 in a different photon dose, would not  
21 necessarily have a proportionate affect on the  
22 neutron dose.

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1           So, I would say if this -- there's  
2           been precedent for this, and Dr. McKeel raises a  
3           point about the legal procedures. This is not  
4           exactly an academic peer review process in  
5           academic publications. But if we would have no  
6           -- there was -- I don't think -- I hope this is  
7           not inappropriate, but this whole modeling of --  
8           some of this modeling requires a certain  
9           sophistication and MCNP. Not to be  
10          discouraging, but again, we go to the man who  
11          teaches the courses to do this, and -- however,  
12          the MCNP itself is an absolutely accepted,  
13          verified code.

14                 It's been used for many, many years.  
15          It's been benchmarked -- I'm would see nothing  
16          inappropriate, and this has already been done,  
17          in sharing the input files so that we have --  
18          for instance NIOSH has shared their input file,  
19          their MCNP input file, and we have reviewed  
20          them. We will be happy -- I think we have  
21          actually, if I remember correctly, passed onto  
22          NIOSH our input files.

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1                   So, they can run. They could  
2 inspect the file. They could rerun the model.  
3 We could come to agreement. It doesn't have to  
4 be something that's hidden or something we do  
5 behind locked doors in a room, and then bring in  
6 somebody else to do it totally without knowing.

7           I see nothing wrong or inappropriate to simply  
8 share the construct. This is just how we did  
9 it.

10                   You can always verify, and I do this  
11 myself. I took the MCNP outputs, and I check  
12 his work by looking up in the manual and make  
13 sure I understand what each parameter means. I  
14 don't have to reinvent it because his computer  
15 is as good as my computer.

16                   So, if they wish to run the -- I see  
17 no reason why they could not run their own  
18 neutron -- it takes patience. It can take a  
19 week of running time sometimes.

20                   CHAIRMAN ZIEMER: Well, and I don't  
21 think we need to specify here how they approach  
22 this, but if you're aware of what they're doing,

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1 the question is -- you guys can make the call on  
2 how to handle that.

3 We understand that SC&A -- or rather  
4 NIOSH has for some time agreed to include  
5 neutrons and formalize it together with the  
6 other changes that are being made  
7 simultaneously.

8 And then issues 5 to 11, you're just  
9 agreeing to address these items. I don't know  
10 if there's anything specifically anyone wants to  
11 ask on those, on 5 through 11. I mean we don't  
12 have anything specific to work with, other than  
13 saying we're going to do this.

14 MR. ALLEN: It's all in that Path  
15 Forward paper. Much of this was various  
16 scenarios or possibilities that were not  
17 addressed, and at least for these issues, the  
18 Path Forward does address them.

19 CHAIRMAN ZIEMER: Okay. Any  
20 questions on those? And so, they'll all remain  
21 open so we have a chance to see what that is.  
22 Also then SC&A will have an opportunity to react

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1 to those.

2 Okay, Evaluation Report issues.  
3 Chairman asked the Work Group also -- or  
4 Chairman of the Work Group also asked that  
5 issues 1, 2, 3, 5, and 6 be addressed. So let's  
6 go through those, maybe individually here.

7 This first one has to do with  
8 incidents, and NIOSH is saying the handling of  
9 incidents is discussed in the cobalt section.  
10 Preliminary review indicates a consistent  
11 frequency through the years that monitoring data  
12 is available. Do you want to clarify that, or  
13 expand on that?

14 MR. ALLEN: Yes. We got the film  
15 badge data from 1964, actually up through I  
16 believe 1973. If you make a cut point -- the  
17 vast majority were not measurable. And if you  
18 make a cut point of 100 millirem on a reading,  
19 indicating something unusual happened, you end  
20 up with a fairly consistent frequency of -- call  
21 it an incident, or a higher exposure is what it  
22 amounts to.

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1           And from that, you can determine a  
2 frequency in the magnitude of that frequency,  
3 and my intent was to show that that was  
4 consistent for those years, and likely  
5 consistent for all years, and add that dose to  
6 anything else that we've modeled together.

7           CHAIRMAN ZIEMER: Okay, and we don't  
8 have that in writing at this point, but SC&A,  
9 you're going to have to consider the  
10 implications of that. I mean we talked a little  
11 earlier about the framework for what do you do  
12 about -- I don't want to necessarily call them  
13 accidents, because I think accidents are a  
14 little different, like the guy taking the thing  
15 home in his pocket, versus something that might  
16 be a more chronic type of --

17           MR. ALLEN: A non-normal operation?

18           CHAIRMAN ZIEMER: Yes, a non-normal  
19 operation. More like people walking through the  
20 site, and how to handle these things in a way  
21 that's fair. And I think whatever you do,  
22 you're not going to be able to capture every

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1 possible thing. You got to say what's  
2 reasonable if you're going to do that.

3 Then we have to decide can we really  
4 bound doses in that framework. So, that will be  
5 probably the issue that we come down to is what  
6 does that mean. Can we really assign dose based  
7 on -- and do we do that at other places?

8 We also have to ask about  
9 consistency. See, I'm not convinced that the  
10 probability of that occurring is any better or  
11 any worse at GSI than any other facility. If  
12 you go to GSI and say, "Well, why don't we do  
13 that at" -- you name it. You got to Hanford or  
14 Bethlehem Steel, or somewhere where we say,  
15 "Okay, I'm going to assign everybody this extra  
16 dose in case they might've done this sort of  
17 non-normal operation thing." So, help me out,  
18 Jim.

19 DR. NETON: You raise a good point.  
20 I mean the whole premise of TBD-6000 is that we  
21 can model the normal operations, and include --

22 CHAIRMAN ZIEMER: And this premise

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1 also, if you bound it, you're including sort of  
2 the --

3 DR. NETON: Right.

4 CHAIRMAN ZIEMER: Sort of the  
5 unusual cases. Not severe accidents. Not  
6 criticalities. Not people taking things home in  
7 their pocket.

8 MEMBER MUNN: Just off-normal  
9 exposure.

10 CHAIRMAN ZIEMER: But off-normal  
11 exposure. So, I -- if you get into this, I want  
12 to think seriously about whether that's really  
13 something you want to do.

14 MR. ALLEN: Well, I think what I'm  
15 proposing here is we probably have inherently  
16 done this in other sites, just by using external  
17 dosimeter for a coworker model. I mean if I  
18 were to use all the dosimetry as a coworker  
19 model here at GSI, it would include these higher  
20 readings.

21 CHAIRMAN ZIEMER: Right.

22 DR. MAURO: See, that's the

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1 difference, and I'll go back to that. Yes, when  
2 you have a nice record of external dosimetry, in  
3 effect, you've captured --

4 CHAIRMAN ZIEMER: Well, supposed you  
5 don't need a coworker -- maybe you do need a  
6 coworker model for that time period.

7 DR. NETON: Let's think about any  
8 kind of source-term model, though. I'm thinking  
9 we've done a number of those for internal  
10 exposures, maybe. Right? Where you hypothesize  
11 or develop a scenario where they could be  
12 internally exposed. Usually, you build in some  
13 conservatism in there to account for off-normal  
14 type situations, right?

15 CHAIRMAN ZIEMER: Yes, but you  
16 haven't added it in as a separate thing. And  
17 said, here is the off-normal dose that I'm  
18 adding in.

19 DR. MAURO: It's built into your  
20 bioassay data.

21 DR. NETON: No bioassay --

22 DR. MAURO: Okay, everything is in

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1 the source-term model.

2 DR. NETON: The source-term model,  
3 which is essentially what these are, right?

4 DR. MAURO: Yes.

5 DR. NETON: I don't know. It seems  
6 like there's a couple examples in here of big  
7 incidents. We talked about this before, where  
8 the big incidents were acknowledged and  
9 discussed in some of the written materials. So  
10 now, the question is to what extent do  
11 situations like that occur more frequently, and  
12 we don't know about it.

13 DR. MAURO: I think that gets to the  
14 heart of it. There are three levels of when  
15 you're coming at a problem, right? One is you  
16 can model that the scenarios you model -- these  
17 are the kinds of things you can place an upper  
18 bound. You can agree on assumptions.

19 Then you have anticipated  
20 operational conditions that were off-normal  
21 conditions, that well, there are times when  
22 something unusual could happen, and try to come

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1 up with a way to deal with that, whether it's  
2 looking at the distribution of the data from the  
3 Kumazawa report, or other data. They have film  
4 badge data that you actually have for post -- I  
5 don't know.

6 And then of course there is other  
7 things, it would be the equivalent of the  
8 blowouts at Ames. You know, these very unusual  
9 things that may have occurred once a year. May  
10 have occurred once every five years. We don't  
11 know.

12 So, we have these three tiers, in a  
13 way. The question becomes, in principle one  
14 could argue, "Well, yes, maybe we could come to  
15 grips with this and put our arms around it."  
16 But then it becomes -- we know where we're going  
17 with this.

18 At the end, it becomes really does  
19 it pass the threshold of acceptability that  
20 we're coming at this problem without any film  
21 badge data? And now if somehow you could show  
22 that while we have pretty good records of when

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1 people were sent to the hospital, or when there  
2 were off-normal conditions that bordered on one  
3 of these more extreme cases, there's some  
4 records to that effect.

5 Well, that would almost like rule  
6 out that, well, we have that less tractable.  
7 Because if it had occurred, we'd have a medical  
8 record of a person sent to the hospital. Now,  
9 you're starting to argue maybe we could deal  
10 with that tie-in. And the off-normal condition,  
11 in a way, it could be tractable for the reasons  
12 we talked about before, by postulating  
13 certainly, looking at the data, and also  
14 postulating certain scenarios.

15 My biggest problem where I think  
16 about this is not the first level, not the  
17 second to third level. The fact that there may  
18 have been a number of significant off-normal  
19 conditions, where in a given change out, there  
20 might be someone that got 2 rem, got 8 rem.  
21 Certainly not the 39 rem, obviously. That  
22 didn't occur. That was something else. But

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1 Bob, for the change outs, what kind of doses did  
2 you receive --

3 DR. ANIGSTEIN: Okay, just a second.

4 During the operational period, we have one of  
5 about -- if I remember correctly, about 2.3 rem.

6 DR. MAURO: The change out?

7 DR. ANIGSTEIN: Everything in one  
8 change out. Everything for one week. In the  
9 post operational period, there was -- there were  
10 two that were afterwards retracted. There was  
11 an accident with the film badge. This didn't  
12 really happen. And Landauer, based on a  
13 petition or request from GSI, subtracted those  
14 doses from the worker's records

15 There was another one of about 7.5 -  
16 - I'm going by memory now, so the number could  
17 be slightly wrong, but somewhere on the order of  
18 7 rem that there was no comment on. Seven rem  
19 in one week. No one said anything. Maybe  
20 because during that period of time, this would  
21 not disqualify the worker from further radiation  
22 work because his cumulative lifetime dose would

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1 not be high enough. Does that make sense?

2 CHAIRMAN ZIEMER: If it's 7 rem in a  
3 calendar quarter, it depends on the year, but  
4 that would've been -- it would've been  
5 reportable to the NRC.

6 DR. ANIGSTEIN: Yes. It was in the  
7 '70s. Now, the NRC records for GSI, they go  
8 right up to 1973 when they furnished  
9 certificates of disposal of those holding the  
10 licensed sources, they went to such and such a  
11 place, they got rid of this operation ---, took  
12 them over, and got rid of the sources.

13 So there is a continuity of records.  
14 Doesn't mean there aren't gaps. There is  
15 nothing. I mean I looked at them, and Dave  
16 Allen looked at them. There is nothing about  
17 exposures, about incidents. The only thing you  
18 get is the usual, "We inspected your facility  
19 and is [identifying information redacted] truly  
20 qualified to be a radiographer?"

21 All the violations were, "You didn't  
22 do a survey of here." I mean, there were no,

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1 what we would call violations of actual safety.

2 However, as far as somebody going to a  
3 hospital, there are no records -- all of the  
4 records -- there are no records, there are no  
5 company records.

6 The only information, the only  
7 documentary information that we have is the  
8 Landauer film badges and the AEC files which  
9 includes two-way correspondence.

10 CHAIRMAN ZIEMER: Yes, but look, if  
11 you had a claimant, and they said, "Look, I was  
12 sent to the hospital after this incident," then  
13 you take that into consideration. So there's a  
14 way to deal with that. We're talking now about,  
15 I think, almost the pre-film badge era to start  
16 with.

17 DR. MAURO: Right, absolutely.

18 CHAIRMAN ZIEMER: And -- and the  
19 sort of idea, are you building in something that  
20 covers non-normal occurrences, or does it get  
21 built in by the way you actually -- you're going  
22 to model some doses in some way or another. You

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1 probably can cross-calibrate them against the  
2 rest of the world with the database that Jim was  
3 talking about, and say, "Do they look a lot like  
4 what everybody else had?" You can certainly do  
5 that as sort of a calibration.

6 But I thought I was hearing that you  
7 were saying, "And we're going to try to estimate  
8 the probability that somebody might've got an  
9 extra, you name it, an extra rem or two because  
10 of sort of semi-regular accidents, and we're  
11 going to throw that in."

12 That's what bothered me in terms of  
13 we don't really do that anywhere else. Why  
14 would we do that here? Is there some reason to  
15 think that -- I mean, GSI, sure, they had some  
16 cases where people wandered through, but we've  
17 heard a lot of people that they had, in general,  
18 pretty responsible workers there that were  
19 cognizant. Not always. I think some of the  
20 folks that we've heard said, "We weren't really  
21 told in the early days exactly what we were  
22 doing."

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1                   That's understandable, too, but it's  
2                   just the idea of -- well, we'll have to see what  
3                   you do with it, Dave, but I'm just sort of  
4                   raising a caution that we need to have some  
5                   consistency on dealing with this issue in the  
6                   rest of the system. So, whatever that is going  
7                   to look like --

8                   MR. RAMSPOTT: Dr. Ziemer?

9                   CHAIRMAN ZIEMER: Yes, sir?

10                  MR. RAMSPOTT: This is John  
11                  Ramspott. Can I make a comment?

12                  CHAIRMAN ZIEMER: Sure can, John.

13                  MR. RAMSPOTT: Well, you and I  
14                  definitely think a lot alike, because you're  
15                  talking about consistency. Yet, everything I've  
16                  heard for the last 15 minutes has been  
17                  inconsistent. If I could just point out a  
18                  couple of things that concern me: why are you  
19                  even looking at film badges that are out of the  
20                  AEC period? The AEC period at GSI ended in '66.  
21                  Why is anybody even looking at badges from  
22                  1973, 1974, other than to extrapolate out

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1 longer?

2 I mean, in fact, you only have two  
3 years worth of badges. So to try and say  
4 something happened in `74 and that should apply  
5 to `53, that's ridiculous.

6 CHAIRMAN ZIEMER: Well, I don't  
7 think anybody's suggesting that at all.

8 MR. RAMSPOTT: Well, they said they  
9 were going to use the badges of `74, unless I  
10 misunderstood Dave Allen.

11 MR. ALLEN: I was going -- I looked  
12 at all the years to see how consistent these  
13 outliers were, essentially.

14 MR. RAMSPOTT: That's what I  
15 thought. Why use them?

16 CHAIRMAN ZIEMER: Mainly to see  
17 whether there was some pattern that -- that  
18 would speak to what was going on in the actual  
19 years that we can use them.

20 MR. RAMSPOTT: Well, that's the  
21 other point I'd like to make. There is no  
22 pattern. In `74 on, they had very little

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1 uranium over at General Steel Industries,  
2 according to the purchase orders. I sent that  
3 information to everyone.

4 CHAIRMAN ZIEMER: Yes.

5 MR. RAMSPOTT: And prior to that,  
6 there's a lot of uranium going to General Steel,  
7 yet there's no badges.

8 CHAIRMAN ZIEMER: Right.

9 MR. RAMSPOTT: Now, we also have  
10 another important cutoff. This radium source  
11 that's come into play, the fish pole, that got  
12 stopped in '62. You know again, I hate to keep  
13 repeating things, but we have no badges. We  
14 have no information.

15 Now, to try and say we're being  
16 consistent, and we're talking about different  
17 radioactive materials there after '64, that's  
18 not consistent.

19 CHAIRMAN ZIEMER: Well, you got to  
20 recognize, John, the different periods of time  
21 may indeed have to be treated separately.

22 MR. RAMSPOTT: Oh, I agree. That

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1 would be a point I'd like to bring up.

2 CHAIRMAN ZIEMER: Yes, and I think  
3 that's what the intent is here, particularly  
4 during the radium period and so on. That's what  
5 we're struggling with is to say how would you --  
6 how would you evaluate the doses, and how would  
7 you evaluate events where there could've been  
8 higher exposures due to somebody not following  
9 appropriate practice?

10 MR. RAMSPOTT: I know. I agree with  
11 you there.

12 CHAIRMAN ZIEMER: Yes. So, that's  
13 part of what I'm raising that issue on is just  
14 asking NIOSH to be consistent in how they do  
15 approach this here with how similar problems are  
16 approached at other sites, if there are. I  
17 think at least conceptually there are some  
18 similarities, but --

19 DR. MAURO: The only problem is, I  
20 think this is the first time where we're dealing  
21 with a population of workers that were involved  
22 in industrial radiography, and no film badge.

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1 This is the unique challenge. And the question  
2 becomes, is this a tractable situation?

3 CHAIRMAN ZIEMER: No.

4 DR. MAURO: And I think that's a  
5 fair question. And if there is a way of  
6 tracking it, it really hasn't been laid before  
7 us.

8 CHAIRMAN ZIEMER: Well, that's --  
9 that's what Dave is going to do, right?

10 MR. RAMSPOTT: There's another  
11 inconsistent factor. We're taking Jack  
12 Schultz's word on output betatron tubes, and  
13 amount of output from betatron devices. We're  
14 taking his word on that. And then we're  
15 questioning, is he right when he goes in and  
16 takes the radioactive reading?

17 He told Dr. McKeel, myself, and  
18 Vincent Couterper that for 15 minutes, he was  
19 told to stay away from the betatron. He was --  
20 that was an order from his company. And he was  
21 not just an average worker. He was their senior  
22 technician there on the betatron. He ran that

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1 analysis lab.

2 So, for a guy like that to come in  
3 and say, "Hey, it's radioactive for 15 minutes.

4 They told me not to go in there, and I'm not  
5 going in there." I think we ought to accept his  
6 word. Why even question it? If we're going to  
7 question it there, I mean, he's given us outputs  
8 for betatrons and we accept that.

9 We need some consistency. We either  
10 believe him or we don't believe him. Or we're  
11 going to use the badges from 1974, but we're not  
12 going to use the worker's testimony after --  
13 well, pre-`68. You can't have your cake and  
14 eat it too. You got to do one or the other.

15 It's like we picked the plum when  
16 it's not to the benefit to the worker, and the  
17 workers have shared that thought with me. It's  
18 like it gets plum-picked. And I'm sorry, but  
19 that's the honest-to-god truth from the workers.

20 This is kind of verifying that.

21 CHAIRMAN ZIEMER: Well, I think  
22 actually we've accepted that information on the

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1 15, and we were puzzled as to why it was  
2 occurring, but nonetheless have accepted that.

3 MR. RAMSPOTT: Is it going to be  
4 accepted? I didn't gather that. If I missed  
5 it, I apologize.

6 CHAIRMAN ZIEMER: If you heard what  
7 I said, I raised the possibility that it  
8 might've been due to electromagnetic.

9 MR. RAMSPOTT: I heard that.

10 CHAIRMAN ZIEMER: But in the absence  
11 of knowing that that was the case, we will have  
12 to accept that it was an actual reading.

13 MR. RAMSPOTT: Okay, so you are  
14 accepting the 15?

15 CHAIRMAN ZIEMER: Sure, sure.

16 MR. ALLEN: And it's in the current  
17 Appendix BB.

18 CHAIRMAN ZIEMER: Yes.

19 MR. ALLEN: It's in there. Then the  
20 question was whether it's accurately described,  
21 or we had worked with it correctly.

22 CHAIRMAN ZIEMER: We described it

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1 correctly or --

2 MR. RAMSPOTT: It's in Appendix BB?

3 MR. ALLEN: Yes, it is.

4 CHAIRMAN ZIEMER: Okay, let's --  
5 that was a question I had on handling the  
6 incidents. Let's see. Issue 2: Exposure  
7 scenarios based on all information that has come  
8 to NIOSH. That was the issue of exposure  
9 outside of the betatron building, where they  
10 might not have been wearing their badges, I  
11 believe was the case, right?

12 MR. ALLEN: I have to look. There  
13 was a number of them based on various -- a  
14 number of different issues based on exposure  
15 scenarios of one type or another, kind of  
16 grouped all together.

17 CHAIRMAN ZIEMER: Right. Issue 2  
18 was SC&A pointed out betatron operators removed  
19 their badges when leaving the betatron building.  
20 And scenarios exist where they might've gotten  
21 additional exposure. And so you are addressing  
22 that.

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1                   MR. ALLEN:     Yes, it's a separate  
2 section on the exposure scenarios.

3                   CHAIRMAN ZIEMER:   Yes.

4                   MR. DUTKO:     May I comment on that,  
5 sir?

6                   CHAIRMAN ZIEMER:   Sure.

7                   MR. DUTKO:     The issue -- the issue  
8 is working in 9 and 10 building.   There were  
9 different jobs in our department.   The film  
10 badges were never issued, too.   At that time, it  
11 was not known that these areas were  
12 contaminated.     Simply, magnaflux was never  
13 issued film badges, and we were under orders,  
14 whether anybody liked it or not, remove our film  
15 badges when we left that betatron.

16                   That was company orders.   Just like  
17 yourself, we obeyed them.   I can't help how that  
18 affects NIOSH, or affects anybody, but that's  
19 the way it was done, people.   Thank you.

20                   CHAIRMAN ZIEMER:   Okay, yes, and  
21 that's the reason this issue is before us is  
22 making sure we account for exposures that

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1 might've occurred under those conditions where  
2 they left their badges at the betatron building,  
3 but got exposed elsewhere. So NIOSH --

4 DR. MCKEEL: Dr. Ziemer?

5 CHAIRMAN ZIEMER: Yes?

6 DR. MCKEEL: This is Dan McKeel  
7 again.

8 CHAIRMAN ZIEMER: Hi, Dan.

9 DR. MCKEEL: Hi. My comment on  
10 Issue 2 is it bothers me that the -- almost the  
11 exclusive subject of our conversation is about  
12 betatron operators. And I just need to remind  
13 everybody they were 100 out of 3,000 people who  
14 worked at that plant, with every person who  
15 worked at the plant being a potential SEC Class  
16 member.

17 So, not only does that make film  
18 badge data for those 108 betatron operators non-  
19 representative of the entire population, but  
20 when you're talking about what other doses  
21 betatron operators could've gotten, that's quite  
22 true. When they didn't have their badges on,

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1 those other doses couldn't have been measured.

2 But remind us all, and we've  
3 established this long, long ago, that when they  
4 brought the new -- when they brought the  
5 betatron from Eddystone and constructed the new  
6 betatron building, that was very close to  
7 building 10. So not only did the people in the  
8 walkway and the bathroom get exposed, but all  
9 the workers who were working in building 10  
10 right next to -- you know, 100 feet away from  
11 the betatron building that was connected to  
12 building 10 with a steel ribbon door that  
13 essentially offered no resistance to the gamma  
14 photons that were coming through.

15 It's that workforce which was being  
16 constantly exposed every time the betatron was  
17 on. And there is no accounting, no measuring,  
18 no modeling. I shouldn't say none. There is  
19 some modeling about skyshine, but those workers  
20 were getting -- were getting dosed as well.

21 So, the solution to the Path Forward  
22 on issue 2, to make new modeling about -- and

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1 new scenarios for the betatron operators leaves  
2 out new modeling for 99 percent of the workers  
3 in the rest of the plant, who, for instance,  
4 around the building 6 radium sources and later  
5 the two cobalt sources, they were also exposed.

6 So, the larger group of people also  
7 needs to be addressed. That's my point.

8 CHAIRMAN ZIEMER: Yes, we understand  
9 that, Dan. The point on issue 2 is that the  
10 issue itself only dealt with these -- this  
11 subset of workers, and how they would be treated  
12 since they had film badges part of the time, and  
13 then were working elsewhere part of the time.

14 The other workers who are not in  
15 this category have to be handled separately, and  
16 that, I believe, is NIOSH's intent. Dave, you  
17 can speak to that.

18 MR. ALLEN: Right, the whole idea of  
19 this particular one is, like I said from the  
20 start, we need to reconcile exposure scenarios  
21 with the data we have, which includes film badge  
22 data. This is one reason where an exposure

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1 would not show up on that film badge data that  
2 adds additional dose, rather than just a  
3 coworker out of the --

4 CHAIRMAN ZIEMER: Right, but you're  
5 looking at that subgroup on this particular  
6 issue. That does not mean you're not looking at  
7 the rest of the workers in the plant who may  
8 have a different model because they don't have  
9 any film badge data.

10 MR. ALLEN: Right. And the whole  
11 idea behind this is we'll have exposure --  
12 essentially dose rates from somebody working  
13 full time at the casting, and -- dose rates, I  
14 should say. Somebody working with the castings.  
15 Somebody working as a betatron operator; other  
16 people working in the betatron building; other  
17 people working with the sources.

18 Then we'll look for a limiting  
19 exposure condition. And in the case of other  
20 people in the plant, folks that would typically  
21 work, or may have worked routinely in that  
22 betatron building, they'd be getting the same

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1 kind of dose that the betatron operators would  
2 get if that was a limiting dose.

3 If it turns out that this casting is  
4 a limiting dose, we'd probably assume most  
5 people were working with those castings all the  
6 time.

7 MR. RAMSPOTT: Dr. Ziemer, this is  
8 John Ramspott.

9 CHAIRMAN ZIEMER: John?

10 MR. RAMSPOTT: NIOSH has already  
11 essentially confirmed that other workers were  
12 more likely to be harmed. Out of 60 people paid  
13 under this program so far, I think we've been  
14 told that four were betatron operators.

15 Now, there's another complication to  
16 that. Most betatron operators -- as an example,  
17 you mentioned [identifying information  
18 redacted], he's a cobalt person who actually had  
19 dealing with the fish pole technique and what  
20 have you. But his primary job, he was a  
21 chemist.

22 So, how can you figure out what

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1 hours you're going to treat him as a chemist,  
2 and what hours you're going to treat him as a  
3 radiographer? Or Mr. Dutko, who was a  
4 radiographer, yet he was a magnafluxer, how can  
5 you figure out their dose? They have numerous  
6 jobs.

7 There's no radiographer that had one  
8 job of 100 percent radiography, if I'm  
9 understanding the workers correct.

10 MR. ALLEN: Right. And the whole  
11 idea, John, is to come up with all the sources  
12 of radiation, come up with the worker exposure  
13 scenarios on how they could've been exposed  
14 during this and during that, and put together a  
15 bounding scenario as to what a typical worker  
16 would be exposed to, worst case, from all these  
17 different sources, knowing that you can't be  
18 exposed to all of them at the same time for the  
19 most part.

20 MR. RAMSPOTT: I mean, they're doing  
21 two or three different jobs.

22 MR. ALLEN: Right. So, in reality,

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1 he's going to be exposed to a higher dose work  
2 at one point, and a lower dose of zero at  
3 another point. We're not going to make that  
4 distinction. We're going to assume a laborer  
5 could be exposed to various ones, and take the  
6 high.

7 CHAIRMAN ZIEMER: You're going to  
8 take the highest of his jobs, and assign that  
9 100 percent?

10 MR. ALLEN: Right.

11 CHAIRMAN ZIEMER: Follow what we're  
12 saying, John?

13 MR. RAMSPOTT: I do, if you can find  
14 out what all these people -- what all the  
15 claimants did.

16 MR. ALLEN: We can find out what all  
17 the sources of radiation is what we're trying to  
18 do, and then if they were not working all the  
19 time with the source of radiation, they're going  
20 to get the benefit of the doubt.

21 MR. RAMSPOTT: Thank you.

22 CHAIRMAN ZIEMER: Okay, let's go on

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1 here. Let's see, what item was that?

2 MEMBER MUNN: Four? That was three.

3 CHAIRMAN ZIEMER: That was three.

4 Four, this has to do with the amount of uranium  
5 work prior to 1958, and the type of radiography  
6 being done. NIOSH says the Path Forward will  
7 develop new exposure scenarios based on all the  
8 information that has come since the Appendix was  
9 approved.

10 This includes information about the  
11 radiography sources. So it's sort of what we've  
12 been discussing before. It's the same issue.

13 MR. ALLEN: Yes.

14 CHAIRMAN ZIEMER: All right. Issue  
15 5 again deals with the film badges and the  
16 attempt to what NIOSH calls reconcile them with  
17 the models. That we talked about earlier. It's  
18 the idea that if you get a model or someone  
19 working in an area where they were also film  
20 badged, you would look and see how well the  
21 model reflects the actual readings.

22 If they are very far apart, it

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1 raises issues about the validity of the model.  
2 So, that has to do with attempts to validate.  
3 Again, we'll have to see. I think SC&A raised  
4 that question, saying that right now, the  
5 existing models are way far apart from the  
6 actual data. So how do you reconcile that?

7 Then the last issue was sort of one  
8 we've been talking about all day. There were  
9 other exposure scenarios that have not been  
10 addressed, and again, this is in the -- in the  
11 Evaluation Report. And so all of those have to  
12 be addressed as they -- as per the matrix  
13 itself. So it's the same thing as before. So  
14 all of that remains to be done.

15 DR. MCKEEL: Dr. Ziemer, this is Dan  
16 McKeel, may I make a comment on those two  
17 issues, please?

18 CHAIRMAN ZIEMER: Yes, please do,  
19 Dan.

20 DR. MCKEEL: All right. On Issue 5,  
21 I've been told, not just by Stuart Hinnefeld of  
22 DCAS and NIOSH, that they would not move forward

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1 on revising Appendix BB until the Work Group and  
2 the Board had finished their deliberations and  
3 reconciled all the issues.

4 But I've also been told the same  
5 thing, and many of the workers have been told  
6 the same thing, essentially, by Rachel Leiton at  
7 Department of Labor, that her department could  
8 not entertain any new evidence that this  
9 document admits.

10 There is voluminous new evidence,  
11 but they cannot use any of this to help  
12 adjudicate claims until the Board basically has  
13 finished their work and made a recommendation,  
14 which if you think about it logically is --  
15 means that all of the dose reconstructions will  
16 have been completed, round 1 and 2.

17 Round 1 is almost complete right  
18 now. Ninety-three or four percent of all GSI  
19 claimants who had their records sent to NIOSH  
20 have had dose reconstructions performed. And  
21 so, request to be -- for their cases to be  
22 reopened based on all this new information, and

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1 two-and-a-half or more years of deliberations by  
2 the Board. Actually, starting in 2007, so 2008,  
3 2009. '10 is well along to being at its end.  
4 But none of that is going to be considered.

5 Here we have a very explicit  
6 statement, which is true. SC&A indicated  
7 there's no agreement between the Appendix model  
8 and the film badge reports. I pointed that out  
9 in my comment on that White Paper that the last  
10 two tables show wide discrepancies.

11 Then NIOSH's response to that, the  
12 Path Forward, addresses developing new exposure  
13 models and reconciling them with the film badge  
14 data.

15 And my point that I'm trying to make  
16 today, and feel I've made no progress, is  
17 actually, once NIOSH did its SEC Evaluation  
18 Report, and turned it over to the Board, then as  
19 far as I'm concerned, making a decision about  
20 the SEC is 100 percent in the hands of the Work  
21 Group, and when they make their recommendation,  
22 whichever way, in the hands of the Board.

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1           It's not in the hands of NIOSH, and  
2           I do not understand why there's been no reaction  
3           to NIOSH saying that basically, despite all the  
4           work that's been done, all the Work Group  
5           meetings and everything, even though there have  
6           been assertions that they're not going to stop;  
7           they're not going to throw out the old work but  
8           simply consolidate it, again we have in Issue 6  
9           the Path Forward addresses developing new  
10          exposure scenarios based on all the information  
11          that has come to NIOSH since the Appendix was  
12          approved, and using those scenarios to revise  
13          the dose estimates.

14                 And it sounds like -- I know it's --  
15          maybe it's implied that a lot of that work has  
16          already been done, but it still seems to me that  
17          this is a blueprint for two to three or four or  
18          five more years of work. And it simply is not  
19          fair to anyone that has a claim in for GSI.

20                 It is just beyond the limits of what  
21          anybody would consider timely consideration.  
22          And I would point out that with Bethlehem Steel,

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1 the Chairman of the Board elected in the absence  
2 of a recommendation by the Work Group that's  
3 been considering Bethlehem, to put forward a  
4 motion to vote on that SEC at the Niagara Falls  
5 meeting, and it was passed finally and Bethlehem  
6 Steel now has an SEC.

7 So I'm saying it really is in the  
8 hands of the Board. They could do that. They  
9 could override NIOSH. But what I'm hearing so  
10 far is basically an endorsement for NIOSH to  
11 take as long as they need to develop all these  
12 new methods, and to validate models.

13 Good heavens. Some of the  
14 validation of particular models, that I'm sure  
15 we could all think of our own favorite examples,  
16 has taken years. And I just don't know any  
17 other way to say it. So I'm going to absolutely  
18 be quiet after this. But it isn't fair, and I  
19 have not heard any kind of expression of that by  
20 this Work Group, and I'm really disappointed in  
21 the most profound way that I can be disappointed  
22 at age 71.

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1 I just don't know what to say. I'm  
2 really dumbfounded. And I'm saying that to  
3 professional colleagues who have done similar  
4 work, but in different fields, and have similar  
5 efforts and so forth. And I just could not be  
6 more unhappy and more disappointed at a result.  
7 So I'm going to be quiet now. Thank you.

8 CHAIRMAN ZIEMER: Okay, thanks, Dan.  
9 And certainly that is on the record here as  
10 well. There are a couple things I'll point out  
11 that -- there are some changes that -- that have  
12 been approved. One of them is the time thing,  
13 but does not show up in the system yet. I guess  
14 that certainly affects past dose  
15 reconstructions.

16 The rest of the items, and let me --  
17 we'll talk about Appendix BB at the moment,  
18 rather than the petitioner's documents.  
19 Appendix BB, the rest of the items may or may  
20 not -- we don't know a priori if they would  
21 affect dose decisions. I don't think we  
22 necessarily know that.

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1                   MR. ALLEN:    We don't know for sure  
2                   that the hours are going to affect the dose, or  
3                   how they're going to affect the dose --

4                   CHAIRMAN ZIEMER:   We don't even know  
5                   whether that will, but it certainly would affect  
6                   the numbers that are used to calculate PoC.

7                   MR.    ALLEN:            The    numbers    will  
8                   certainly change.    It's not clear which way  
9                   overall because the -- you've got to remember  
10                  the film badge data all came after the Appendix  
11                  was written also.

12                  CHAIRMAN ZIEMER:   Right.

13                  MR.    ALLEN:            And by reconciling  
14                  everything with that film badge data, it's not  
15                  clear whether the overall answer is going to be  
16                  higher or lower.

17                  CHAIRMAN ZIEMER:   Right, higher or  
18                  lower.    So, that may or may not help a person.  
19                  As far as the SEC petition is concerned, and  
20                  Ted, you may have to speak to this, but I think  
21                  there are other cases where the -- after --  
22                  because we do have an issue resolution process

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1 on the SEC review.

2 The fact that an issue was raised  
3 does not necessarily mean NIOSH is wrong or  
4 NIOSH is right. We have to go through the  
5 process. A priori, the fact that SC&A raised  
6 these issues does not necessarily mean that what  
7 has gone before is wrong. It is -- it may be,  
8 but it may not be.

9 So, we can't assume that in advance.

10 In fact, in -- like any other peer review, I've  
11 had plenty of papers reviewed where I've  
12 prevailed with the referee, and convinced them  
13 that I was right, and sometimes they prevailed  
14 and I've had to revise a paper.

15 But in any event, the process is  
16 intended to come to right closure. I don't  
17 think that the fact that a petition gets an  
18 initial Evaluation Report that is challenged  
19 means that the Evaluation Report is necessarily  
20 wrong.

21 At the moment, NIOSH has the  
22 position that it can reconstruct dose. SC&A

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1 has, I believe, and John, you can characterize,  
2 has agreed that in many cases they can  
3 reconstruct dose, but they have some questions  
4 about certain things, particularly the early  
5 time period, and whether some doses were  
6 neglected.

7 And so, we have to answer that. So,  
8 we cannot ignore what SC&A has raised, but that  
9 does not mean that -- that the original  
10 Evaluation Report was necessarily wrong, other  
11 than, NIOSH has admitted, in a sense, that there  
12 are some perhaps better ways of doing this and  
13 they are going back. But we don't know even  
14 there whether that will cause you to say, "I  
15 can't reconstruct dose," or, "I still can, but  
16 it may be a different number."

17 So I think the process, frustrating  
18 as it is, still has to proceed. Ted, do you  
19 want to comment on that?

20 MR. KATZ: Paul, you asked me  
21 earlier about what we can do about priority of  
22 this moving forward, because it seems like until

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1 you have this new TBD with all the issues  
2 reconciled, and SC&A able to look at that and  
3 say, "Is anything left outstanding, unaddressed  
4 that has SEC potential?" At the end of that  
5 process, until you have that, you're -- the  
6 timing is out of your control to a certain  
7 extent.

8 So we've -- I mean, the Board as a  
9 whole is trying to engage in this process of  
10 improving sort of the priorities, or aligning  
11 priorities between the Board and DCAS to move  
12 sites along that need to move along sooner,  
13 because of a case like this where there's been a  
14 lot of work already done, or what have you.

15 So certainly the Board can take this  
16 up as a, should GSI -- does it want DCAS to move  
17 faster on GSI for whatever cost that might have  
18 on another site? Moving something else back,  
19 putting it on a slower track. That's -- I think  
20 that's an issue that we're going to take up at  
21 every Board meeting.

22 We have now a system for looking at

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1 all these different priorities at the same time,  
2 and seeing what's happening when and what might  
3 need to be changed in terms of priority. I  
4 think we have a Board meeting coming up soon,  
5 where we can have a discussion about some cases  
6 that need to be moved up.

7 In the meantime, I mean, certainly  
8 it behooves DCAS to figure out, do some  
9 figuring, as to what kind of resources it can  
10 marshal, and what kind of pace can be made in  
11 getting this done.

12 I mean I totally sympathize when Dan  
13 says that he doesn't want to look at two more  
14 years of this or whatever, of not even seeing  
15 what the resolution is in terms of how dose  
16 reconstruction is going to be handled and  
17 getting those people, those claimants' claims  
18 re-handled. I sympathize with that completely.

19 So, let's have DCAS have a chance to  
20 figure out what the time frame can be, and the  
21 Board can engage on whether this is one where  
22 it's going to ask -- it's not really for me to

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1 do, but the Board can certainly put out there  
2 that it would like for certain products from  
3 DCAS to come first.

4 CHAIRMAN ZIEMER: Well, I would  
5 certainly offer, during our upcoming meeting, to  
6 raise this issue of priority. I wonder if it's  
7 possible, either Dave or Jim, between now and  
8 then, if you can sort of find out what -- what  
9 you have on your plates, and the extent to which  
10 -- I mean, you might say, "You know, we  
11 recognize that, but there are -- there's this,  
12 this and this, which also is pressing as  
13 priority with the agency."

14 I mean, the agency has its agenda  
15 too. And to some extent, we're subject to that.

16 I can't demand that this be put up the list  
17 anymore than someone else can demand that their  
18 particular site, Los Alamos or Hanford or  
19 whatever, Idaho, be at the top of the list.

20 MR. KATZ: Well, every site is going  
21 to have these concerns, right? Every site is  
22 going to want to be dealt with. But certainly

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1 the Board can make its concerns known about --  
2 about sites or products where it would like to  
3 see faster progress.

4 I mean, then it's really up to DCAS  
5 to dispose on this issue, and to make decisions  
6 as to what, why, where.

7 CHAIRMAN ZIEMER: Yes. And what  
8 should be looked at in the scheme of things is  
9 when did the process start for a certain site?  
10 This is certainly one that's been on the platter  
11 a long time. But anyway.

12 DR. MAURO: I'd like to create --  
13 just put on the table another option. The way  
14 we talked about these issues was that there was  
15 a big basket filled with issues, all of which  
16 are to be processed, and the process could be  
17 somewhat protracted for some, maybe more  
18 expeditious for others.

19  
20 But I see it as really two baskets,  
21 okay? There's that basket, where -- but there's  
22 a basket of issues which are what I consider to

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1 be core issues that almost border on the kind of  
2 thing -- like surrogate data. I think there's a  
3 class of issues before this Work Group that  
4 deals with the time period where there's no film  
5 badge data.

6 There's non-destructive testing,  
7 radiological examinations going on, where the  
8 potential for off-normal conditions could've  
9 existed without any documentation for the extent  
10 to which they occurred. That's a very special  
11 basket in my mind. It's a new basket, and it's  
12 one that goes to the heart of the SEC issue.

13 In my opinion, that's the SEC issue.

14 All these other areas, over a very -- possibly  
15 over a protracted period of time, we'll work it  
16 out. We'll work it out. How long was the  
17 person in the bathroom when the betatron was  
18 off? Was there anybody up here, or standing  
19 outside the strip door?

20 See, these are things that  
21 reasonable people could say, "Okay, I think this  
22 is a good bounding approach. It's plausible.

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1 We can deal with it." But that itself is going  
2 to take some time.

3 While we're -- if it turns out we  
4 wait until we resolve all that, and let's say we  
5 do. It's a year from now, and we resolve all  
6 that. You know where we're going to be? With  
7 that first basket.

8 The first basket is the showstopper.

9 If we can't -- if the Board -- the Work Group  
10 and the Board struggles with the idea that we've  
11 got 10 years of people working in radiographic  
12 operations, no film badge data and no radiologic  
13 protection, occupational records, programs where  
14 we could track people who might've been injured,  
15 might've received overexposure, if that's the  
16 case.

17 So, to me, it's almost like we're  
18 looking over here, but we should be looking over  
19 here first because this may turn out in a  
20 relatively short period of time. I guess this is  
21 where I would be looking. I'll be looking to  
22 Jim and the rest of the crew, saying, "Listen.

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1 I think we got a handle on this. This is why.  
2 Okay? Because if you can solve that, I know we  
3 can solve this. I'm not sure you can solve  
4 that."

5 CHAIRMAN ZIEMER: You're talking  
6 about the pre-film badge era?

7 DR. MAURO: Pre-film badge. I'm  
8 saying right now, the critical path on whether  
9 this goes down as an SEC or not is going to be  
10 how the pre-1962 time period is going to be  
11 dealt with for the issues that I just described.

12 If there's a way to come to grips  
13 with that: either there is or there isn't. And  
14 it's going to have to meet the test of  
15 satisfaction of not only the Work Group, but the  
16 full Board. To spend enormous resources, try to  
17 polish the apple on ones that we know we're  
18 going to be able to resolve. We're going to  
19 resolve them, but it's going to take some time,  
20 but we'll work it out.

21 And then after going through all  
22 that, after another year or more, and then the

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1 showstopper becomes this basket, that seems to  
2 be not an efficient way to go. Do we have -- in  
3 other words, is it over because of the pre `62  
4 problems? If it's over, let's not even waste  
5 our time with this.

6  
7 Later, I'm going to go through a  
8 scenario. Fine. If it turns out that's -- we  
9 can't deal with this. I'm not sure if we can.  
10 Okay, SEC is granted through `62. Post-`62,  
11 we're not sure whether you're going to have an  
12 SEC there or not, but at least that's a little  
13 bit more tractable. Because if we can't -- then  
14 we could polish that apple, and say, "Okay, what  
15 can we do about that?"

16 I'm not -- I'm not saying that's a  
17 done deal, but I feel a degree of confidence as  
18 a health physicist that these are tractable  
19 issues. They may or may not be in the judgment  
20 of many people, but right now, my sensibility  
21 about it is it can.

22 But I got to tell you, this other

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1 basket of questions, I don't see it. I see some  
2 serious challenges to trying to get over that  
3 hump.

4 CHAIRMAN ZIEMER: I guess what  
5 you're suggesting is you want to prioritize part  
6 of this, and try to come to early closure, and  
7 take the early years, and tell us how you will  
8 treat them, then deal with the details on the  
9 later years: the film badge records.

10 DR. MAURO: Yes.

11 DR. NETON: I don't disagree with  
12 John. I mean, this is something he said many  
13 times. I mean, if we're going to prioritize  
14 anything, this ought to be the one because  
15 clearly, he's voiced his concerns --

16 CHAIRMAN ZIEMER: Suppose we did  
17 that, and -- and agreed that you really are not  
18 able to bound the early years. Then what --  
19 what, procedurally, would the petition get? How  
20 would it --

21 DR. NETON: Well, if we all agreed  
22 technically, then it would be a matter of

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1       revising the Evaluation Report to say that, and  
2       then we could re-present it. I'm not saying  
3       we're agreeing.

4                   CHAIRMAN   ZIEMER:       No, this is  
5       hypothetically.

6                   DR.   NETON:       This has happened  
7       before. Other Working Groups agree that the  
8       early years should be added. We revise it,  
9       present it to the Board. Then we vote on the  
10      remaining items. That's, mechanically, how it  
11      happens.

12                  MR. ALLEN: I guess that whole thing  
13      is basically one of the reasons I put together  
14      this Path Forward is, we think this is the Path  
15      Forward to estimating the dose. And the  
16      question now is, is this Path Forward going to  
17      work for the Work Group? Or is this, the  
18      approaches that are taken in here, the general  
19      approaches toward coming up with these numbers,  
20      because the numbers are irrelevant, as John is  
21      basically implying.

22                  What's important is, can it be done

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1 as far as the SEC goes? This is our approach on  
2 how we intend to do that. If it's not going to  
3 be sufficient, I would just as soon not go  
4 through the models and the notes.

5 CHAIRMAN ZIEMER: Well, I -- I am  
6 wondering if I could impose on your Path Forward  
7 an additional criterion, and that is, you  
8 subdivide it, and say, "Okay, we'll try this  
9 Path Forward for the early years for now,  
10 because that's a smaller issue." It removes  
11 some of the sources from consideration. It  
12 focuses on, well, primarily the radium, but you  
13 might have to consider a couple others that may  
14 have preceded the film badge period, the iridium  
15 possibly and so on.

16 But you know, what would you do in  
17 those early years to bound doses? That's what  
18 it's going to amount to.

19 MR. ALLEN: And I think it's in  
20 there. It's --

21 CHAIRMAN ZIEMER: Yes, and the only  
22 differential would be that you would use your

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1 model because you're going to have the same  
2 groups as workers, and you're still going to  
3 have betatron workers.

4 MR. ALLEN: Yes.

5 CHAIRMAN ZIEMER: But they are  
6 betatron workers who are not badged at the front  
7 -- well, let's see. No, wait a minute. The  
8 badging started about that time. It's going to  
9 mainly the other sources, the radiography stuff.

10 DR. MAURO: Way back, interestingly  
11 enough, all the attention was on the betatron.

12 CHAIRMAN ZIEMER: Right.

13 DR. MAURO: But the reality is the  
14 betatron can be modeled.

15 CHAIRMAN ZIEMER: Right.

16 DR. MAURO: And a plausible upper  
17 bound can be assigned, but we disagree on some  
18 of the assumptions. I'm more concerned about  
19 the time period where they were working with  
20 sources, and there is some uncertainty to what  
21 sources those are, but sources, whether it's the  
22 radium source, iridium source or even a cobalt

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1 source.

2 I'm more concerned about those ten  
3 years where you're working with sources, and  
4 I'll say it again, and you don't have film badge  
5 data. See, to me, that's a class of problem  
6 that's different than we've ever seen before.

7 And I don't know if you would agree  
8 or not, but we've never been in the circumstance  
9 where you're dealing with a fairly volatile  
10 subject, namely radiography, where these things  
11 happen. Things do happen, and they're a  
12 continuum up to some serious things.

13 We have a ten-year period, where  
14 people are doing some -- it's in the '50s, a  
15 time period where a lot of things happened that  
16 were unpredictable, and you don't have film  
17 badge data. I think this is -- and if you go to  
18 a two-prong process, well, sure. Let's keep  
19 that basket moving. All of the betatron issues,  
20 all of the post-'62 issues, and move that  
21 forward as best you can.

22 But in parallel, perhaps, as quickly

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1 as possible, try to get through the pre-`62  
2 issues. Bring that before the Work Group.  
3 Bring that before the Board as quickly as  
4 possible, and at a minimum, the outcome of that  
5 would be one, I don't think we can reconstruct  
6 those doses.

7 Now, this would be a judgment the  
8 Work Group or the Board makes. And if it ends  
9 that way, at a minimum, there's at least some  
10 resolution for the workers and the claimants to  
11 get the SEC up to `62.

12 What happens after `62? I don't  
13 know. In other words, I'm trying to find a way  
14 to deal with the heart of the problem. That's  
15 the tough nut. I think the other half is  
16 tractable, but I could be wrong.

17 CHAIRMAN ZIEMER: Okay, let's hold  
18 that thought a minute. I'm going to declare a  
19 ten-minute comfort break. Then we'll come back  
20 and see, get some comments from the other Board  
21 members, and then decide if we want to move in  
22 that direction. Then we're going to talk about

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1 Bliss & Laughlin.

2 MR. KATZ: Okay, break for ten  
3 minutes.

4 (Whereupon, the above-entitled  
5 matter went off the record at 3:12 p.m., and  
6 resumed at 3:27 p.m.)

7 MR. KATZ: This is Ted Katz with the  
8 TBD-6000 Work Group. We're just reconvening  
9 after a short break.

10 CHAIRMAN ZIEMER: Okay, we've been  
11 discussing the idea of splitting, for purposes  
12 of streamlining effort and maybe efficiency,  
13 splitting NIOSH's possible work on going forward  
14 into, say, two parts: one to cover the early  
15 years, and one the later years.

16 First, I want to get some feedback  
17 from the Board members as to whether you think  
18 this is a good idea. And maybe before I ask  
19 them for comments, I want to ask you, Dave, if  
20 we were to suggest that as an approach for going  
21 forward, in other words take the Path Forward  
22 ideas, but apply them primarily to the early

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1 years, would that allow us to get a product  
2 perhaps earlier than otherwise? Or would that  
3 take less resources? Are we gaining much as far  
4 as workload in doing that?

5 The idea being that that may be, as  
6 John suggests, that may be where the SEC  
7 problems would lie. And if so, would we benefit  
8 by splitting it up that way? Maybe it's too  
9 early for you to say, but if you have a comment  
10 on whether that would be a sort of efficiency  
11 process that would be helpful on evaluating the  
12 SEC.

13 MR. ALLEN: Well, certainly some of  
14 the work is only involving post-`62, `63. And  
15 so, if I were to prioritize a network wouldn't  
16 necessarily have to be done before we give you  
17 the pre-`62 stuff. So it would be faster. As  
18 far as how much faster, I --

19 CHAIRMAN ZIEMER: Too early to say.

20 MR. ALLEN: Yes.

21 CHAIRMAN ZIEMER: Yes. In  
22 principle, it should lessen the immediate work

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1 scope so you can concentrate on the early  
2 period, and perhaps we would be in a position to  
3 move forward on the SEC petition, at least for  
4 the early years.

5 DR. MAURO: I think that there  
6 certainly are issues that transcend both sides.

7 CHAIRMAN ZIEMER: Yes.

8 DR. MAURO: But we have certain  
9 issues on the pre-`62 time frame that don't --  
10 don't necessarily need to be a high priority.

11 For example, there are a lot of  
12 issues associated with modeling the doses from  
13 the betatron that applied pre-`62 and of course  
14 post-`62. That's not, in my mind, what's really  
15 at play from an SEC perspective in terms of  
16 being important.

17 In my mind, the attention in the  
18 pre-`62 that goes -- that the spotlight needs to  
19 be on, is issues related to non-destructive  
20 testing, radiography at a time period with no  
21 film badge and very limited, if any, radiation  
22 controls that we know about by either the state

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1 or the feds.

2 That's how I frame the problem, and  
3 explore that aspect of the problem, pre-`62, and  
4 the degree to which coming to grips with  
5 assigning plausible upper bounds is tractable.

6 Quite frankly, I wouldn't even look  
7 at the betatron at that time. I mean, in my  
8 opinion, I would look at the other issues  
9 because those are the places where -- because  
10 the betatron is a modeling problem. Of course,  
11 there's going to be lots of disagreement and  
12 debate. Did you model it properly and  
13 completely?

14 But these other kinds of issues  
15 regarding off-normal conditions handling radium,  
16 off-normal conditions if there are other sources  
17 that could've occurred from time to time: these  
18 are the things that have troubled me from the  
19 beginning.

20 So, I would say this is what I'd  
21 focus in on, in order to try to, as  
22 expeditiously as possible, zero in on pre-`62.

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1                   MR. KATZ: My one concern about that  
2                   -- I mean, I understand that, and I agree with  
3                   it in some part, but my one concern is that it  
4                   really depends on what -- on what DCAS produces  
5                   related to these issues that John says.

6                   Because, say DCAS does what John  
7                   says, and just focuses -- forgets the betatron,  
8                   and just focuses on that, and puts it to bed,  
9                   thinks it can do this. And say the Work Group  
10                  deals with that, and says, "Okay, we'll go with  
11                  this."

12                  You still then have to -- you can't  
13                  -- you can't dispense with the pre-'62 period  
14                  until you deal with the betatron.

15                  DR. MAURO: That's the truth.

16                  MR. KATZ: So in one path that might  
17                  work very well and be efficient, but then you  
18                  still have the betatron question for the pre-'62  
19                  hanging out --

20                  CHAIRMAN ZIEMER: Well, I suspect  
21                  that what you're saying is if they're show  
22                  stoppers without the betatrons, then -- then

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1 that's where you are. If you're able to  
2 characterize that as --

3 DR. MAURO: Then you still --

4 CHAIRMAN ZIEMER: You still have to  
5 go back and do the betatron. Okay, comments.  
6 Josie?

7 MEMBER BEACH: I'm in agreement with  
8 looking at that -- Dave, looking at it, I'm  
9 assuming you're going to get back to the Work  
10 Group and let us know the time frame, but I  
11 think it's a good approach to move forward with  
12 the earlier years if possible.

13 MR. ALLEN: Yes. Like I said, I have  
14 no idea how much time that'll buy us.

15 CHAIRMAN ZIEMER: Well, hopefully at  
16 our next meeting when we talk about  
17 prioritization, and if I raised the issue, we  
18 will raise it -- if we agree on this, we'll  
19 raise it in these terms. Wanda, let me hear  
20 from you.

21 MEMBER MUNN: Well, the Board  
22 certainly has adequate precedent for parsing,

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1 especially SEC issues, when there is a clear  
2 design in mind where technical improvements or  
3 changes in process have occurred, any over a  
4 given size. I see no reason why the  
5 introduction of film badge data should not be  
6 considered a major technical change in how this  
7 facility was operated. And therefore, it's a  
8 logical point on which to consider the  
9 possibility of splitting up the SEC.

10 CHAIRMAN ZIEMER: Well, and beyond  
11 just the film badges. It's the introduction of  
12 formalized regulatory procedures that were  
13 imposed on --

14 MEMBER MUNN: They all came along --

15 MR. ALLEN: There was about a two-  
16 year period where a lot of things changed. They  
17 got a new betatron building, film badges, AEC  
18 license.

19 MEMBER MUNN: Major technical  
20 changes.

21 CHAIRMAN ZIEMER: Well, I think we  
22 have consensus on taking that approach to the

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1 Path Forward, focused initially on the early  
2 years in an effort to get more rapid process or  
3 progress, particularly vis-a-vis the SEC issues.

4 We can put that to bed one way or the other in  
5 perhaps a quicker fashion.

6 So let us agree to proceed on that  
7 basis, and ask if possible at our full Board  
8 meeting that, if you can, to give us an estimate  
9 of -- well, we still have to talk about the  
10 prioritization, but maybe you will be in a  
11 position to lay this out with other items for  
12 the Board to consider, I suppose.

13 I'll raise the issue from our point  
14 of view, but there will be other priorities.  
15 So, I don't think we're asking you to commit to  
16 this above everything else at the moment.  
17 Simply be aware of our concerns, and make sure  
18 that we have this on the agenda, and  
19 specifically raise this and ask other Board  
20 Members the extent to which we can sort of move  
21 it up in the queue, if there is a queue.

22 I don't know if there's a queue. In

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1 our minds there's a queue, and we're always at  
2 the bottom of the queue. All the other Work  
3 Groups get all the attention. I'm only kidding.

4 Everyone thinks they're at the bottom of the  
5 queue. We're all at the bottom of the queue.  
6 It's sort of an inverse Lake Woebegone factor.  
7 We're all below average.

8 Okay, we will proceed on that basis.

9 I do want to give petitioner -- Dan, do you  
10 have any other comments you want to make before  
11 we move onto Bliss & Laughlin?

12 DR. MCKEEL: Can you hear me now  
13 unmuted?

14 CHAIRMAN ZIEMER: Yes.

15 DR. MCKEEL: Okay. No, I don't  
16 believe I do. I'm very pleased to hear this  
17 direction for the Path Forward. I think it  
18 makes a lot of sense. I really think to focus  
19 on what can be done scientifically in those  
20 first ten years would clarify what's appropriate  
21 for the last years.

22 I do have to say that as far as that

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1 cutoff period though, there's very little new  
2 monitoring data. There's really none for film  
3 badges prior -- except for '64, '65 and '66.  
4 And although the betatron was getting moved, and  
5 although the AEC was taking the more active  
6 role, at least as based on the NRC FOIA  
7 material, they were just applying for the  
8 license and getting it approved for the two  
9 small cobalt sources in 1962.

10 So, although practices were  
11 changing, there's no real film badge data before  
12 1964. So, to me, the time where they have more  
13 data, but again only for betatron workers, is  
14 '64, '65 and '66, and not very much before 1964.

15  
16 So, anyway I really appreciate all  
17 this hard work and I think I'm going to have to  
18 return to my good wife and get back on the road.

19 So, I thank you very much for everything.

20 CHAIRMAN ZIEMER: Yes. Thanks for  
21 being with us today, Dan.

22 DR. MCKEEL: Okay, thank you, Dr.

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1 Ziemer.

2 CHAIRMAN ZIEMER: Safe travels.

3 DR. MCKEEL: Goodbye.

4 CHAIRMAN ZIEMER: Comment?

5 DR. ANIGSTEIN: Before we leave GSI,  
6 I'd like to get clarification. There are a  
7 couple of -- there's some unfinished business  
8 that SC&A has started that frankly for lack of  
9 time, I got drafted ten days ago for work on  
10 Linde, which I had not anticipated.

11 So, the air activation issue, we're  
12 basically being asked to look at all portable --  
13 all other radiography sources, and the air  
14 activation sort of came under that category.  
15 And so, as I said, we did the analysis, but  
16 haven't quite finished it to give you a result.

17 So, I would -- I mean I'm just  
18 asking for direction. My plan had been to  
19 submit a small White Paper on this with these --  
20 with the conclusions and with the --

21 CHAIRMAN ZIEMER: On the air  
22 activation?

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1 DR. ANIGSTEIN: Yes.

2 CHAIRMAN ZIEMER: Well, I'm  
3 wondering if we shouldn't hold that until we see  
4 what NIOSH does with it. Hold that in reserve  
5 so that there's not at least a perception that  
6 you're out in front on this. Not that you're  
7 not out in front, but -- and I think Ted's  
8 points are well made, but there is a perception  
9 that we need to be cognizant of what -- let  
10 NIOSH have a chance to see how they deal with  
11 air activation.

12 Then you can easily say, "Yes, we  
13 agree with this or we disagree based on our  
14 analysis."

15 DR. ANIGSTEIN: Okay. And the  
16 other, again, works in progress, is -- I pointed  
17 this out in an email to all the Board Members  
18 here, and NIOSH staff, a summary account on my  
19 interview with [identifying information  
20 redacted]. So, what my plan was, he even  
21 requested it, is to write that up in a more  
22 formal manner, and send him -- I have to send

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1 him a letter by snail mail because he doesn't  
2 have email, and ask him to sign it, or edit it  
3 as he wishes or sees fit.

4 And then that would become another  
5 submission. So, I would need to do that. And  
6 also probably since I had raised the point, two  
7 other workers that I have frequent contact with;  
8 I casually called them up to get verification up  
9 on the 200 keV X-ray machine.

10 Given that this issue was raised, I  
11 probably should do that also, submit more --

12 CHAIRMAN ZIEMER: Well, if it's not  
13 in writing, it's -- it's not that helpful, I  
14 guess. I would think that it would be useful  
15 documenting that. You've got to get their  
16 agreement if it's not recorded, but you got to  
17 get their agreement as to what was said.

18 DR. ANIGSTEIN: Yes.

19 CHAIRMAN ZIEMER: Then I think that  
20 needs to be provided to the Work Group.

21 DR. ANIGSTEIN: Yes.

22 MR. KATZ: No, I agree. I think you

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1 need to document all that properly and submit  
2 it, and then we'll have it in our record.

3 CHAIRMAN ZIEMER: And make it  
4 available to NIOSH. You can't make it available  
5 outside of that. You can't send it to the  
6 petitioners.

7 DR. ANIGSTEIN: No, of course not.

8

9 CHAIRMAN ZIEMER: Dan asked for  
10 something that you have talked about.

11 DR. ANIGSTEIN: We can't send it to  
12 them because of privacy.

13 CHAIRMAN ZIEMER: No, but you can --  
14 a redacted copy can be provided to them.

15 DR. MAURO: Just by way of --

16 DR. ANIGSTEIN: Excuse me. Does  
17 that make sense to have a redacted copy? "I  
18 talked to blank who told me" -- I mean the last  
19 time we went --

20 CHAIRMAN ZIEMER: I did that because  
21 I interviewed the one fellow who claims to have  
22 worked with what they said was the iridium

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1 source. I wrote that all up, and when I sent it  
2 to him, he said, "Well, it wasn't really an  
3 iridium source. It was cobalt."

4 But anyway, I provided that to the  
5 petitioners also, but all the names were  
6 redacted. They knew exactly what it was -- who  
7 it was.

8 DR. ANIGSTEIN: Of course.

9 CHAIRMAN ZIEMER: In fact, the  
10 people I sent it to were the people who had  
11 already talked to him on the side, because I  
12 think they had seen my original draft. He had  
13 shared it with them. They had told him that he  
14 did work with the iridium source.

15 DR. MAURO: As a general rule, we do  
16 not send anything to anyone but Ted --

17 CHAIRMAN ZIEMER: No, you wouldn't  
18 send --

19 DR. MAURO: Right. So, everything  
20 goes to Ted for ultimate distribution to members  
21 of the public for petitioners or claimants. So,  
22 we don't send anything.

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1                   MEMBER BEACH:     So I have one for  
2                   clarification. Does it make any sense to update  
3                   any of the matrices that we have?

4                   CHAIRMAN ZIEMER:     Probably does,  
5                   even if it's just general terms. I didn't pull  
6                   it up yet, but we have a discrepancy on how many  
7                   findings there are on the matrix for -- for the  
8                   Evaluation Report.

9                   DR. ANIGSTEIN:     There are two  
10                  matrices.

11                  CHAIRMAN ZIEMER:    I know. There's  
12                  three actually that --

13                  DR. ANIGSTEIN:    TBD-6000.

14                  CHAIRMAN ZIEMER:    Right.

15                  MEMBER BEACH:     Appendix BB has 13  
16                  issues.

17                  CHAIRMAN ZIEMER:    Right.

18                  MEMBER BEACH:     And the last update I  
19                  have on that one was December 8th, 2009. Then  
20                  the GSI, I think the latest one was October  
21                  12th, 2009. But there was an earlier version  
22                  that Bob sent me that had more issues on it than

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1 the later version.

2 CHAIRMAN ZIEMER: Yes, and we talked  
3 at the last meeting about other issues. In  
4 fact, Dave's paper talks about issues 3 through  
5 11.

6 DR. ANIGSTEIN: Now there are issues  
7 3 through 11.

8 CHAIRMAN ZIEMER: Josie pulled it  
9 up, and her copy only shows ten issues. It's  
10 the Evaluation Report for the SEC --

11 DR. ANIGSTEIN: Matrix?

12 CHAIRMAN ZIEMER: Matrix.

13 DR. ANIGSTEIN: I should know since  
14 I prepared it.

15 MEMBER BEACH: My thought is just we  
16 need to get them updated.

17 CHAIRMAN ZIEMER: Yes.

18 MEMBER BEACH: So that they -- and  
19 we -- we didn't go into any discussion on the BB  
20 matrix today.

21 CHAIRMAN ZIEMER: Well, actually, we  
22 did.

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1                   MEMBER BEACH:     It looks different  
2     from the ones we were talking about.   That's my  
3     concern.

4                   CHAIRMAN ZIEMER:   On page six of the  
5     Path Forward.

6                   MEMBER BEACH:   Oh, okay.

7                   CHAIRMAN ZIEMER:   The "Appendix  
8     review." Appendix is BB.

9                   MEMBER BEACH:   Right, right.

10                  CHAIRMAN ZIEMER:   You can mark that  
11     in, "Issues raised for Appendix BB."   The  
12     Appendix review part --

13                  MEMBER BEACH:   Okay, pardon me.

14                  CHAIRMAN ZIEMER:   Yes.    Issues 3  
15     through 11 -- Issues 4 through 11 are addressed  
16     by the Path Forward, and Issue 3 is not.   Issue  
17     3 was the output of the machine.   So, those are  
18     the carryover ones.

19                  MEMBER BEACH:   There's just --  
20     possibly we need to maybe take that out as  
21     updating all of them.   I believe we closed out  
22     the 6000 matrix today.

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1                   CHAIRMAN ZIEMER: Well, pending the  
2 agreement by other --

3                   MEMBER BEACH: Right, right.

4                   DR. ANIGSTEIN: You're saying that  
5 the SEC issues matrix has 11 issues?

6                   CHAIRMAN ZIEMER: It shows up in our  
7 notes here as having 11, and you talked about it  
8 --

9                   DR. ANIGSTEIN: Not the one I have.

10                  CHAIRMAN ZIEMER: Well, I'm looking  
11 at the part of --

12                  DR. ANIGSTEIN: I hear you, but I'm  
13 looking at the original matrix, and it's only --

14                  CHAIRMAN ZIEMER: Oh, no. I'm  
15 sorry, Evaluation Report issues. You only  
16 talked about Issues 1, 2, 3, 5 and 6.

17                  MR. ALLEN: All right, the original  
18 one there had 10 issues.

19                  MEMBER BEACH: That's what I said.  
20 I had 10, and the Bob sent the earlier one that  
21 had 11.

22                  DR. ANIGSTEIN: No, it had 13. That

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1 was the --

2 MR. KATZ: It's the evaluation  
3 matrix.

4 MEMBER BEACH: Okay, that was the --  
5 okay.

6 CHAIRMAN ZIEMER: Okay, so you've  
7 got the right version.

8 MEMBER BEACH: Yes.

9 DR. MAURO: Let me ask you. In  
10 terms of -- sometimes SC&A goes in and updates  
11 matrices, like we did the TBD-6000 -- should we  
12 take care of this?

13 CHAIRMAN ZIEMER: Yes. Update this  
14 because you don't have anything to add, other  
15 than NIOSH will address this under the Path  
16 Forward. Refer to -- and the one where we  
17 talked about the 100 and the 250 was a separate  
18 one.

19 DR. ANIGSTEIN: Wait a second. How  
20 -- I need formal guidance now. Updating which  
21 one? The Appendix BB or the SEC?

22 MEMBER BEACH: Both.

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1 DR. ANIGSTEIN: Okay, and how are  
2 they to be updated?

3 CHAIRMAN ZIEMER: Appendix BB, and  
4 you can look on the Path Forward paper to get  
5 some guidance here. Appendix BB -- let me pull  
6 this out here - starts on page six. It says  
7 Issues 3 through 11 -- rather, Issues 4 through  
8 11 are addressed by the Path Forward. So, you  
9 would say NIOSH will address this issue, as set  
10 forth in -- when you refer to the Path Forward  
11 document.

12 DR. ANIGSTEIN: So, I could --

13 CHAIRMAN ZIEMER: Issues 3 through  
14 11 -- or 4 through 11.

15 DR. ANIGSTEIN: The way it's  
16 structured -- again I just want to know the form  
17 of it. The way it's structured is we have a  
18 place where we have an SC&A finding. Then we  
19 have a NIOSH response. Then we have a space  
20 that hasn't been filled in yet. There's always  
21 a space for Board action. So, should this be  
22 added to the NIOSH response that NIOSH is going

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1 to --

2 CHAIRMAN ZIEMER: That is the NIOSH  
3 response.

4 DR. ANIGSTEIN: That is the NIOSH  
5 response, okay.

6 CHAIRMAN ZIEMER: NIOSH will address  
7 this.

8 MEMBER BEACH: And it's generally  
9 per this --

10 DR. ANIGSTEIN: So, I will make it  
11 with the prerogative of doing -- of filling in  
12 the NIOSH space with the summary of what --

13 CHAIRMAN ZIEMER: That's okay with  
14 you guys, right?

15 MR. ALLEN: Sure.

16 CHAIRMAN ZIEMER: Just say that,  
17 NIOSH will address this, as outlined in the  
18 October 2010 Path Forward.

19 DR. ANIGSTEIN: Okay.

20 CHAIRMAN ZIEMER: Then on Issue 3,  
21 that's where we agreed to the 100 and the 250  
22 numbers.

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1 DR. ANIGSTEIN: Actually, we already  
2 wrote a separate response, instead of putting it  
3 into the matrix. Suppose we made a new matrix  
4 combining everything.

5 CHAIRMAN ZIEMER: Like we did on the  
6 other thing, yes. Put in the actual responses.

7 DR. ANIGSTEIN: Yes, without --  
8 without -- nothing gets eliminated. It just  
9 gets filled in.

10 MEMBER BEACH: With the new date.

11 DR. ANIGSTEIN: Okay.

12 CHAIRMAN ZIEMER: The way you did  
13 this first letter, that's good.

14 DR. MAURO: The TBD-6000 is the way  
15 we -- that's the format, and that works.

16 CHAIRMAN ZIEMER: You can attach the  
17 documents that it refers to.

18 MEMBER BEACH: Then the other  
19 question I have is on the Path Forward. Will  
20 there be any formal review other than what we  
21 did today, the work we did today, of this  
22 document? Or is this just a working -- just for

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1 the meeting? It's NIOSH's plan, and if there's  
2 any -- any other items that need to be put onto  
3 it, or is this just for the meeting?

4 DR. MAURO: I've got to say I hate  
5 to lose that material because that became an  
6 important document that helped track this  
7 meeting. As far as I'm concerned it should be  
8 attached to, electronically and hard copy.

9 CHAIRMAN ZIEMER: Well, you can  
10 attach this to both the --

11 DR. ANIGSTEIN: The way we -- the  
12 way we just said it was going to be done is go  
13 through the matrix, and fill in for the separate  
14 issue. Keep those issues -- the issue number,  
15 the issue title, will remain the same. We'll  
16 simply fill in another entry under each issue  
17 how it's been discussed. So, we don't need to  
18 attach.

19 DR. MAURO: So what happens --

20 MEMBER BEACH: This becomes an  
21 Appendix. Doesn't this become an Appendix?

22 (Simultaneous speaking.)

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1 DR. ANIGSTEIN: This is a NIOSH  
2 document.

3 DR. MAURO: Yes.

4 DR. ANIGSTEIN: So, we don't put  
5 that --

6 CHAIRMAN ZIEMER: Yes, you do.

7 DR. ANIGSTEIN: Excuse me. I'm not  
8 going to take from it, but I'm not going to put  
9 the document itself --

10 MEMBER BEACH: Well, wait a minute.  
11 David Allen -- David Allen's -- it was Appendix  
12 8 in the matrix that was sent out.

13 CHAIRMAN ZIEMER: It's an attachment  
14 to the matrix.

15 DR. ANIGSTEIN: An attachment to the  
16 matrix?

17 CHAIRMAN ZIEMER: Right. It's not  
18 in the matrix. It's an attachment.

19 DR. ANIGSTEIN: Is this a NIOSH  
20 document or our document?

21 DR. MAURO: It's not ours. This is  
22 the Work Group's matrix.

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1 DR. ANIGSTEIN: Okay.

2 DR. MAURO: And we're just helping  
3 the Work Group keep track of everything.

4 CHAIRMAN ZIEMER: Okay, this keeps  
5 it together.

6 DR. ANIGSTEIN: Okay, fine.

7 CHAIRMAN ZIEMER: And then -- and  
8 then the responses on the -- on the Evaluation  
9 Report matrix are the responses that they gave  
10 here. Issue 1, they had their -- the issue on  
11 the handling of incidents will be discussed in  
12 the cobalt section of the Path Forward, and so  
13 on.

14 So, their responses are given here,  
15 and you can, again, attach the document.

16 DR. MAURO: This is complicated.  
17 There's going to be a transcript, and I got to  
18 tell you to work it out eventually you've got --  
19 just like Bill, when he prepared the latest  
20 version, he had to go through the transcript to  
21 tease everything out. There's no escaping it.

22 CHAIRMAN ZIEMER: Yes.

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1 DR. MAURO: It'll take a little time  
2 to get it out, but I don't think there's a rush.  
3 Wait for the transcript.

4 CHAIRMAN ZIEMER: I just want to  
5 make sure you have it..

6 DR. ANIGSTEIN: Well, we're going --  
7 I mean, another question. The transcript is --  
8 what's the latest rule on the transcript?

9 CHAIRMAN ZIEMER: Well, those --

10 MR. KATZ: Thirty days.

11 DR. ANIGSTEIN: Thirty days?

12 MR. KATZ: It's About 30 days, 35  
13 days.

14 CHAIRMAN ZIEMER: And the  
15 uncorrected transcript goes on right away?

16 MR. KATZ: I send it to them when  
17 they need it.

18 DR. ANIGSTEIN: When is it -- I've  
19 never seen it.

20 MR. KATZ: It gets PA reviewed. It  
21 then gets reviewed by the Chair of the Work  
22 Group. And then finally --

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1 (Simultaneous speaking.)

2 CHAIRMAN ZIEMER: The PA review.

3 MR. KATZ: But you just get the  
4 original one that comes from the transcriber.

5 DR. ANIGSTEIN: I see. And there is  
6 a corrected one later?

7 MR. KATZ: Yes.

8 DR. ANIGSTEIN: Wait a second. I've  
9 never gotten one.

10 MR. KATZ: Yes, those are the --

11 (Simultaneous speaking.)

12 DR. ANIGSTEIN: I've never gotten  
13 one --

14 MR. KATZ: No, but, I've sent many  
15 to SC&A when someone needs one.

16 DR. MAURO: That's right. I email  
17 Ted and tell him I need one.

18 DR. ANIGSTEIN: Okay, I see. Okay,  
19 so in 30 days we can get the raw transcript,  
20 right?

21 MR. KATZ: Thirty-five days.

22 DR. ANIGSTEIN: Okay, I didn't

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1 realize that.

2 MR. KATZ: But really, there wasn't  
3 that much sort of change done to the Path  
4 Forward, except that we --

5 CHAIRMAN ZIEMER: We were mainly  
6 getting clarity of understanding of the --  
7 basically, we have to see what it is. I mean  
8 this hasn't committed us to any particular thing  
9 here, other than they're going to look at  
10 certain things. I think that's just what you  
11 refer to. Okay, any questions? You okay,  
12 Josie?

13 MEMBER BEACH: Sure.

14 CHAIRMAN ZIEMER: Okay, let's move  
15 onto the Bliss & Laughlin. Okay, I just want us  
16 to move right to Table 1. It's page six of 37.  
17 I just want to go through the summary of  
18 findings. They're all together here in a table.

19 DR. GLOVER: Is this the SC&A  
20 report?

21 CHAIRMAN ZIEMER: No, this is yours.  
22 No, this is SC&A. I'm sorry. This is SC&A's

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1 review of the ER.

2 DR. GLOVER: This is the one I asked  
3 you about, John, and you said it -- the PA  
4 review went out. So, I wasn't for sure if this  
5 was --

6 DR. MAURO: When you look at the PA  
7 review, though the -- I'm not sure. Yes, it's  
8 out and it's the same material. And is Bill  
9 Thurber on the line?

10 MR. THURBER: Yes, I am.

11 DR. MAURO: Great, because I'm  
12 looking to you, Bill, to help out here when the  
13 time is right.

14 MR. THURBER: Sure enough.

15 CHAIRMAN ZIEMER: Okay, now first of  
16 all, is everybody okay now? Got the document?  
17 The NIOSH evaluation bottom line is in the  
18 middle paragraph. "Based on its analysis of  
19 these available resources, NIOSH found no part  
20 of the Class under evaluation for which it came  
21 out estimated radiation doses with sufficient  
22 accuracy."

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1           And then one would have to go back  
2           to the Bliss & Laughlin ER, the appendices of  
3           that. And then there are seven findings that  
4           SC&A provided us. I just want to go through  
5           those in a preliminary way today. We don't need  
6           to try to resolve them. This is just a  
7           preliminary discussion that's necessary to make  
8           sure we understand those.

9           What we will want to have at some  
10          point will be NIOSH's responses. So, that will  
11          be the next step on this. This is second  
12          highest priority, is it, for NIOSH? Okay, so,  
13          the first finding for NIOSH referenced the  
14          procedural standards were for performing  
15          individual dose reconstructions.

16          My impression is that this is a  
17          fairly minor finding. You just want them to  
18          flush out --

19          DR. MAURO: Yes, Bill can explain.  
20          When I read it, and Bill read it, we both found  
21          that really confusing. I wasn't quite sure  
22          exactly what the instructions were, and some of

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1 the cases appear to have instructions that were  
2 tremendously over-concerning. Or, maybe we  
3 misunderstood the instructions. Bill, could you  
4 please --

5 MR. THURBER: Yes. I don't disagree  
6 with what the Chairman said, but the way the  
7 report read was do you -- we've got procedures  
8 and they're great. Trust us. And it was -- it  
9 was a motherhood statement, which would have  
10 benefitted by saying, these are the procedures  
11 we used. Not just trust us. We're good.

12 CHAIRMAN ZIEMER: So, it's a clarity  
13 issue at this point. Is that correct?

14 MR. THURBER: That's correct.

15 CHAIRMAN ZIEMER: Well, any  
16 questions or comments, Board Members, on that?  
17 I'm not trying to dismiss it or close it. I  
18 just want to make sure you understand that right  
19 now you're not questioning the procedure so much  
20 as saying, what are they?

21 MR. THURBER: Right. We can't  
22 question them because we don't know what they

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1 are, and they're probably fine, but we don't  
2 know.

3 (Simultaneous speaking.)

4 CHAIRMAN ZIEMER: Okay. Sam, do you  
5 have any particular sort of preliminary response  
6 on that?

7 DR. GLOVER: We certainly in the  
8 evaluation didn't put a lot of the details. We  
9 did present some of those details at the Board  
10 meeting, but we could certainly flush that out  
11 in our response to the Board.

12 CHAIRMAN ZIEMER: Let's see, SC&A,  
13 any other questions on that?

14 MR. THURBER: I don't.

15 CHAIRMAN ZIEMER: Okay, the second  
16 one, NIOSH should ensure that the text of the  
17 SEC Petition Evaluation Report is consistent  
18 with spreadsheet 2009, and the text correctly  
19 describes the analyses that were done.

20 So, it sounds like there was some  
21 mismatch here. You want to clarify that?

22 MR. THURBER: Indeed, there was a

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1 mismatch. I think I can remember whether Sam or  
2 David Allen or somebody provided me with  
3 spreadsheet 2009, and there was a lot of small  
4 things that we describe in greater detail in the  
5 section 7.2.3.1 that need to be sorted out.

6 They don't change -- I don't think  
7 any of them will change any of the conclusions  
8 of the results, but the -- there needs to be  
9 some minor corrections made, I think.

10 CHAIRMAN ZIEMER: So, that sounds  
11 like it's fairly doable also, in rather short  
12 order. Are you aware of what the mismatches  
13 are, Sam, at this point?

14 DR. GLOVER: There was some back and  
15 forth as to whether this report was actually out  
16 or not. So, I didn't try to respond against  
17 this, but will.

18 DR. MAURO: Our main goal today is  
19 just to summarize our concerns.

20 DR. GLOVER: Yes.

21 DR. MAURO: And everyone get a sense  
22 of the magnitude of the concerns.

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1 DR. GLOVER: I put a spreadsheet  
2 together when we were putting together the dose  
3 reconstruction for the Board. I'm pretty sure  
4 that's what was forwarded. It came from Dave.  
5 That's probably because I was probably on  
6 travel.

7 MR. THURBER: I think that's right,  
8 Sam.

9 CHAIRMAN ZIEMER: There's some  
10 inconsistencies between some wording in the  
11 report, versus what the spreadsheet says.

12 DR. GLOVER: Yes, that sounds like  
13 it's --

14 CHAIRMAN ZIEMER: Readily handled,  
15 and can work on resolutions fairly quickly.  
16 Third one, NIOSH needs to be prescriptive as to  
17 how calculations are to be performed for a  
18 bounding analysis. Again, I guess this is  
19 prescriptive to the dose reconstructors. Was  
20 that the intent?

21 MR. THURBER: Yes. The issue here  
22 is this: that the amount of work that was done

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1 at Bliss & Laughlin was very small. There were  
2 five one-day machining campaigns over the course  
3 of a couple years. The problem is that the  
4 document didn't provide any guidance on how to  
5 treat the periods between the machining  
6 operations, and prior to the start of the  
7 residual period, when the machining operations  
8 were concluded.

9 And the result of that was I believe  
10 there was a case where the dose reconstructor  
11 assumed that the worker was exposed for the  
12 whole duration between when the first machining  
13 was done, and when the last machining was  
14 completed, like 400 or 500 days, instead of five  
15 days.

16 That seemed to me to be overkill.  
17 Certainly, that's very favorable for the  
18 claimant, but that seemed to stretch the bounds  
19 of plausibility a little bit. And I thought  
20 that it would be appropriate to be more  
21 prescriptive in providing guidance in how to  
22 deal with that question.

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1 DR. GLOVER: I could maybe speak a  
2 little bit to this. All the dose  
3 reconstructions were done using TBD-6000 for the  
4 entire time for them, because we didn't know  
5 that it was only done for five days. And as we  
6 had learned, there were only five rollings.

7 So, what I presented at the Board  
8 meeting would be a scaled-down model, where we  
9 would actually deplete the source-term. Nobody  
10 was analyzed against that. Every dose  
11 reconstruction done to that date was done with  
12 the TBD-6000. I don't know, 16,000 -- maybe it  
13 was more than that -- dpm per meter cubed, 365  
14 days a year.

15 So, that was a bounding case, and  
16 now we would only have five rollings, and that  
17 would give us a lower dose. So, there is --

18 CHAIRMAN ZIEMER: Again, the  
19 response is fairly easy then.

20 DR. GLOVER: Yes, sir.

21 CHAIRMAN ZIEMER: Yes. Okay on that  
22 one? Yes. Okay, Number 4, While SC&A agrees

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1 that it's possible to bound inhalation exposures  
2 during the residual period, SC&A does not  
3 believe that assuming a source-term depletion of  
4 one percent per day is an appropriate bounding  
5 approach.

6 MR. THURBER: This is something we  
7 have commented on before. I think it's an issue  
8 that's still in limbo. As we pointed out in the  
9 past, if you use a depletion rate of one percent  
10 per day, that's not consistent with a  
11 resuspension factor of one times ten to the  
12 minus six per meter. So, this is not a new  
13 issue.

14 CHAIRMAN ZIEMER: Is this covered in  
15 the resuspension document?

16 DR. MAURO: OTIB-70 issue.

17 CHAIRMAN ZIEMER: Right.

18 MR. THURBER: Yes, it is. Yes, it  
19 is.

20 CHAIRMAN ZIEMER: So, this is going  
21 to be actually move to TIB-70.

22 MEMBER MUNN: Procedures

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1 Subcommittee.

2 MR. KATZ: Procedures Subcommittee.

3 MEMBER MUNN: Yes, we already got  
4 it.

5 CHAIRMAN ZIEMER: Right. That one  
6 is, but I'm saying here that's going to be the  
7 resolution on this one.

8 DR. NETON: And that was the  
9 citation in the ER probably.

10 DR. GLOVER: OTIB-70 probably.

11 DR. NETON: Well, this is what we  
12 talked about this morning. I want to make sure  
13 that the citation is in the ER so that it's  
14 tracked against --

15 DR. GLOVER: Which is which.

16 CHAIRMAN ZIEMER: Right. In other  
17 words, if the ER doesn't say that, then it's a -  
18 - the ER says it, then we're okay however they  
19 end up.

20 DR. MAURO: So, would you know off-  
21 hand, when you see that one percent per day in  
22 the ER, do they make reference to any particular

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1 source document or do they just opt out without  
2 referring to another document?

3 MR. THURBER: I don't know. It may  
4 be in here, John.

5 DR. MAURO: Okay.

6 MR. THURBER: I haven't looked at  
7 this in that detail for months.

8 DR. MAURO: Okay, no problem.

9 CHAIRMAN ZIEMER: We can pick it up  
10 real quick. But yes, that'll solve this one  
11 very easily also. Okay, SC&A concurs with NIOSH  
12 that external operation exposures can be bounded  
13 based on the information in Table 6.4 TBD-6000.

14 Why is that a finding?

15 DR. MAURO: Normally, we don't put  
16 positive findings in. If we concur, we don't  
17 make it a finding.

18 MR. THURBER: I guess I was tired of  
19 being a bad guy when I wrote it.

20 DR. GLOVER: I want that one. I  
21 want that response.

22 CHAIRMAN ZIEMER: Okay, so, we'll

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1 call this a surprise finding. So, I don't think  
2 it's a finding. It's a comment. Because I  
3 think we classified findings as basically issues  
4 to be --

5 DR. MAURO: No action has to be  
6 taken.

7 CHAIRMAN ZIEMER: No action. Okay,  
8 the next one, "While we believe that it's  
9 possible to use the information in TBD-6000 to  
10 make bounding calculations for external  
11 exposures, the use of Table 5.1 as the basis may  
12 not be bounding, since it is based on an assumed  
13 air concentration of 70 dpm per cubic meter, a  
14 value neither supported in the source document,  
15 nor by measurements at B&L."

16 Sam, what's your response on that,  
17 or do you have one at this point?

18 DR. GLOVER: I was going to see what  
19 --

20 DR. MAURO: This is the residual  
21 period again, and I remember the 7 number being  
22 another issue that comes out of OTIB-70, I

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1 believe. In other words, there's a rule of  
2 thumb where you assume that the residual period,  
3 a certain percentage -- I've seen that number  
4 before. So, I do not --

5 MR. THURBER: It's in TBD-6000. I  
6 don't recall that TBD-6000 cross-references that  
7 number to -- to OTIB-70. What it does is the  
8 number really comes from the assumptions they  
9 make as to the exposure level during the  
10 operating period, but away from the guts of the  
11 operation, if you will. And the argument goes  
12 that we have some data that shows that that  
13 ratio is a factor of 100 between the operating  
14 site and the environment adjacent, but removed  
15 from the operating site during the operational  
16 period.

17 And furthermore, we think that the  
18 10 MAC is a good number for the operation, and  
19 therefore taking this ratio of 100, we decided  
20 that 7 dpm per meter cubed is a good number for  
21 the environment away from the -- directly away  
22 from the operation.

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1           The way that that 7 dpm gets used is  
2           that NIOSH says, "Well, if we have 7 dpm per  
3           meter cubed, and those particles are falling on  
4           a surface at the terminal velocity of 7.5 times  
5           10 to minus 4, that we're going to get a surface  
6           concentration of X, given whatever time we  
7           decide is the appropriate deposition period.  
8           Then in the residual period, the worker is  
9           exposed to external radiation from that ground  
10          surface."

11           We just felt that that was not --  
12          that the conceptual model was okay, but we  
13          didn't that the number 7 dpm per meter cubed was  
14          properly supported, either in TBD-6000, nor by  
15          the actual measurements that were made at Bliss  
16          & Laughlin during these machining operations.  
17          So, that's what's behind it.

18           DR. MAURO: Bill, would it be fair  
19          to say that to apply this chronic deposition for  
20          the course of a year at 7 dpm really is not  
21          incompatible with the mode of operation that  
22          took place?

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1                   MR. THURBER:    No.    It would seem  
2                   that a reasonable bounding approach would be to  
3                   take whatever the measurements were at B&L, and  
4                   allow them to occur for the -- some -- some  
5                   period of time related to the machining period,  
6                   and use that as the starting point.  But I think  
7                   the conceptual model is okay in my view.

8                   CHAIRMAN ZIEMER:  Okay, well --

9                   DR. MAURO:  That's all there is.

10                  CHAIRMAN ZIEMER:     I guess Sam,  
11                  you'll have to resolve a response to that.  At  
12                  least you know the issue that they've raised.

13                  DR. GLOVER:  Yes, that's fine.

14                  DR. MAURO:  I think that what we're  
15                  saying is I think the whole model grossly  
16                  overestimates the dose.

17                  DR. GLOVER:  I think, There's a bit  
18                  of a disconnect in that we put the bounding  
19                  model as what we had already done; that 365  
20                  days, and then use TIB-70.  We also then at the  
21                  worker meeting put forth the more elaborate  
22                  discussion, and I can provide that.  It's not

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1       been documented fully.

2                   DR. MAURO:     That approach would be  
3       fine for denial -- otherwise, what you're saying  
4       is we have a machinery in place, for the purpose  
5       of denial.     But I don't think it would be  
6       appropriate to grant on the basis of assumptions  
7       that overestimated dose is no longer -- you  
8       know, off the charts.

9                   DR. GLOVER:    That's how they were  
10      done, and they were paid that way.    They were  
11      paid that way because it's all we knew.   Now,  
12      then, going forward, we can put -- we can  
13      provide some of the details that will answer  
14      some of the questions that are here, where we've  
15      used a relative 70.   But the bounding approach  
16      is what we've already done is I guess what I put  
17      forward.

18                   CHAIRMAN ZIEMER:    But it's not the  
19      model that's of concern.   It's the numbers that  
20      are being plugged in.

21                   DR. GLOVER:    Right.   Agreed.

22                   DR. MAURO:     For example, the one

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1 assumption for the work area versus the non  
2 work area, I think we found data from there.  
3 It's just the chronic situation --

4 DR. GLOVER: I think even in this  
5 more elaborate model, we took some of the  
6 residual contamination periods and came up with  
7 different half lives. So, we could do -- so,  
8 anyway, I think a response back, we could --

9 DR. MAURO: So, do you plan to  
10 revise this Site Profile?

11 DR. GLOVER: I think we would  
12 certainly not continue to use --

13 DR. MAURO: Okay.

14 DR. GLOVER: But I can't say. I  
15 don't think we would continue to use 365 days at  
16 TBD-6000 for future dose reconstructions.

17 MR. ALLEN: I'm trying to remember  
18 if we've got an Appendix for this one or not?

19 DR. GLOVER: No. The Appendix was  
20 never --

21 DR. MAURO: Just the ER.

22 DR. GLOVER: So, the ER is out

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1       there.    We would need to put an updated dose  
2       reconstruction method in place.       Dose  
3       reconstruction instructions.

4                   CHAIRMAN ZIEMER:   Okay, last one is  
5       section 3.4.2 and 7.1.5 of TBD-6000.   "Offer  
6       different approaches to estimating surface  
7       contamination or surface concentrations."   NIOSH  
8       -- I think it should read, "should make clear."  
9       It says, "should made clear."   Should make  
10      clear when it is appropriate to use either  
11      approach, and should correct section 7.1.5 to  
12      indicate if deposition occurs for 16 hours per  
13      day.   And then the surface contamination issue.

14                   MR. THURBER:   In a sense, obviously  
15      this is a comment that relates to TBD-6000, but  
16      as you look at TBD-6000, you say, "How am I  
17      going to do what I need to do?"   There are some  
18      questions that come up, and as I say, the -- the  
19      two sections that we cite there, I think that  
20      one of them says, "Assume the deposition occurs  
21      for seven days."   The other one says it occurs  
22      for 365 days.

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1 I believe implicit in the numbers,  
2 and certainly not explicit, is that the  
3 deposition duration during the day is 16 hours  
4 per day. You can't find that in the document,  
5 and therefore, there's a transparency issue.

6 CHAIRMAN ZIEMER: Do you agree, Sam,  
7 that you use 16 hours? It was calculated based  
8 on those numbers, right? Am I right? You back  
9 calculated them and said, "They must've used 16  
10 hours a day."

11 MR. THURBER: No. I think that  
12 actually either Sam or David told me that.

13 CHAIRMAN ZIEMER: Okay.

14 DR. GLOVER: There's something in  
15 TBD -- there's a discrepancy between TBD-6000  
16 and TIB-70. And so, I think a lot of this is --  
17 these are all tied together. If I just put  
18 together a few page summary on these are the  
19 calculations on the update, we could actually  
20 then address all these questions.

21 CHAIRMAN ZIEMER: TBD-6000 is being  
22 revised to show that all we're doing is

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1 referring to TIB-70, right? How else can that  
2 work out? But what does he do in the meantime?

3 MR. ALLEN: That's for the  
4 resuspension factor.

5 CHAIRMAN ZIEMER: That's part of  
6 this, right?

7 MR. THURBER: These particular  
8 items, findings 6 and 7, don't relate to the  
9 resuspension factor. They relate to external  
10 dose during the residual period.

11 CHAIRMAN ZIEMER: Oh, yes, I see.  
12 Okay, well, the last one says, "Radiation  
13 emission and resuspension." Okay, well, what  
14 was your reference to TIB-70 then? Or, was it  
15 you that --

16 DR. GLOVER: I believe we used  
17 whatever approach was supplied. TIB-70 is a  
18 newer document since these were done.

19 CHAIRMAN ZIEMER: Right.

20 DR. GLOVER: So, TIB-70 has some  
21 different recommendations than what TBD-6000 did  
22 on some of the between -- because we had such a

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1 non-uniform --

2 CHAIRMAN ZIEMER: That's still the  
3 deposition part of the process.

4 DR. GLOVER: Yes, so that's part of  
5 the deposition and resuspension. They're all  
6 tied in.

7 DR. MAURO: If it helps any, we  
8 explored the whole idea of the deposition  
9 velocity approach, if you know the dust loading.  
10 You want to figure out what's on surfaces. You  
11 could multiply by this deposition velocity.  
12 After quite a bit of work with Dave, we're fine  
13 with that.

14 Now, in this case, it sounds like  
15 you're applying that concept, except you didn't  
16 have that situation. You had a dust loading  
17 that was known, that was chronic, for a whole  
18 year. It was only there for a day, and then  
19 it's not there anymore. Later on, it shows up  
20 again.

21 So, the concept of the deposition  
22 velocity works, given that you know the dust

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1 loading. But you have to factor in it wasn't a  
2 chronic circumstance here. It was an episodic  
3 circumstance.

4 MEMBER MUNN: And the time factor is  
5 the same?

6 DR. MAURO: And the time factor is  
7 the whole --

8 CHAIRMAN ZIEMER: So, Sam, you're  
9 going to prepare a response to this one then?

10 DR. GLOVER: Yes. I'll -- most of  
11 these are interrelated quite a bit.

12 CHAIRMAN ZIEMER: Really 6 and 7 are  
13 the main ones. The other ones are little fixes  
14 you're going to have to make, it looks like. I  
15 mean 5 is not a finding, and 1, 2, and 3 are  
16 really just verifying what you're doing.

17 Well, at any rate, we do need  
18 responses on all of these. Looks like it's not  
19 going to be a major effort on these.

20 MR. ALLEN: This is a revision to  
21 the ER's?

22 DR. GLOVER: I think this -- we

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1 won't change the ER, I don't think before the  
2 bounding condition.

3 CHAIRMAN ZIEMER: No, but you're  
4 going to -- you're going to tell us. You're  
5 going to respond. This is a matrix.

6 MR. KATZ: Yes, this is a matrix.  
7 So, it's responsive to the matrix.

8 CHAIRMAN ZIEMER: I don't think you  
9 necessarily have to revise the ER. It's normal  
10 practice.

11 MR. ALLEN: That was my question.  
12 But you're right. A White Paper-type of  
13 response for these ER issues is what you're --

14 CHAIRMAN ZIEMER: You're basically  
15 telling us how you're going to do it.

16 DR. NETON: I'm confused as to where  
17 we are with this. This was a recommendation to  
18 deny Bliss & Laughlin, then it came over to the  
19 TBD-6000 Work Group.

20 CHAIRMAN ZIEMER: Right.

21 DR. NETON: And then this was their  
22 review of the ER?

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1 CHAIRMAN ZIEMER: Yes.

2 DR. MAURO: Yes. How it got here,  
3 how Bliss & Laughlin, without having -- see,  
4 most of the -- most of the Site Profiles that  
5 make it --

6 DR. NETON: There's no Site Profiles  
7 --

8 DR. MAURO: I know. Stay with me  
9 for a minute. Most of the Site Profiles, all  
10 the Site Profiles, that are cited as an Appendix  
11 to TBD-6000 make it to this Work Group. Now,  
12 what I'm a little --

13 DR. NETON: I think we presented  
14 this at a Board meeting.

15 DR. MAURO: We did.

16 CHAIRMAN ZIEMER: It was an SEC  
17 Petition.

18 DR. MAURO: Oh, I know it was  
19 explicitly assigned to this Work Group. I lost  
20 track of that.

21 DR. NETON: So, the Board has not  
22 taken any action on this, pending the review.

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1                   CHAIRMAN ZIEMER:     But they are a  
2     TBD-6000 --

3                   DR. NETON:     Right.     So, I think if  
4     we satisfy those review comments in a White  
5     Paper, then we're good to go.     The Board can  
6     come back with their recommendation.

7                   CHAIRMAN ZIEMER:     Yes.     Your bottom  
8     line is we can reconstruct dose, and you want  
9     clarity on --

10                  DR. NETON:     We just want to make  
11     sure we tidy up --

12                  MR. KATZ:     It sounds like ultimately  
13     you'll need another Appendix, but that's a TBD -  
14     -

15                  MR. ALLEN:     Not an Appendix.     There  
16     is no Appendix.

17                  MR. KATZ:     I know there's no  
18     Appendix right now, but then there are these  
19     issues that you can't just apply TBD-6000 the  
20     way it is, right?

21                  CHAIRMAN ZIEMER:     No.     It's how  
22     they're applying it in this case.

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1                   MR. ALLEN:     There's a number of  
2     sites that have a handful of claims.     Didn't  
3     write an Appendix or TBD or anything, and the  
4     dose reconstructions stand on their own.

5                   DR. NETON:    Like I said, there's two  
6     outstanding Bliss & Laughlin claims at this  
7     point.

8                   MR. ALLEN:    I'm surprised there was  
9     any.    I didn't think there was any.

10                  DR. NETON:    There's two active.

11                  CHAIRMAN ZIEMER:    It would seem to  
12     me that just a brief White Paper clarifying  
13     these items, then we can put this to bed.    And  
14     then the Board; we would be in a position to  
15     make a recommendation to the full Board.  
16     Whether or not you want to redo the ER for your  
17     purposes I guess is up to you.    I don't think  
18     we're requiring it, are we?

19                  MEMBER MUNN:    No.    Absolutely not,  
20     as long as the White Paper has a response that  
21     answers --

22                  CHAIRMAN ZIEMER:    I want to ask this

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1 question now, and I'll ask it of the Board  
2 Members and SC&A. We know what the fixes are on  
3 1 through 5, and we think we understand 6 and 7  
4 in general terms. You need to see that, or are  
5 you satisfied with what you heard verbally  
6 without a written response on 6 and 7? The  
7 reason I ask that is I want to know if we're  
8 ready to make a recommendation at the Board  
9 meeting.

10 DR. MAURO: SC&A's position is that  
11 every issue that we've uncovered is tractable,  
12 can be fixed. Okay, so, we do not see any SEC  
13 issues here.

14 However, we do see a number of  
15 fixes. There's some repair that has to be done  
16 so that the doses can be reconstructed in a way  
17 that's consistent, and -- and plausible. And  
18 now, the question becomes if there are more dose  
19 -- now, for SEC. As far as we are concerned,  
20 there are no SEC issues here.

21 This is SC&A's findings. You heard  
22 what the findings are. They certainly in our

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1 mind don't sound like any SEC issues. That  
2 doesn't mean there aren't issues that have to be  
3 fixed, but they're fixable. How you fix them is  
4 really your decision. You can issue a Site  
5 Profile, a White Paper. A revised ER. But all  
6 I'll say is we reviewed the ER, and we found no  
7 SEC issues.

8 CHAIRMAN ZIEMER: Well, I guess what  
9 I'm asking the Work Group is are we prepared to  
10 recommend to the Board in Sante Fe that we  
11 concur with NIOSH and SC&A on Bliss & Laughlin?  
12 If we concur, that would be that we believe  
13 that radiation doses can be estimated with  
14 sufficient accuracy.

15 MEMBER MUNN: If we say that, we'll  
16 have to say that in the absence of written  
17 responses to the questions that were raised. If  
18 we're comfortable with having --

19 CHAIRMAN ZIEMER: That's why I'm  
20 asking the question.

21 DR. NETON: But SC&A has  
22 acknowledged that the questions that were raised

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1 are not SEC issues.

2 DR. MAURO: Let me -- there was a  
3 time when we talked about something called proof  
4 of principle. That was important at the time,  
5 and Mark Griffon brought it up, and on occasion  
6 Mark and I talk about this.

7 When there is a proposed fix to a  
8 problem that in theory seems to be tractable but  
9 is complicated, and maybe you don't have all the  
10 data you think you have to do it. And maybe it  
11 will actually work. Until you see it done, it's  
12 hard to say, even though on first blush the  
13 conceptual approach that's being offered up  
14 seems to be workable.

15 When you're in that circumstance,  
16 and that, by the way, occurred for example at  
17 Rocky, in this case, I don't see -- I heard -- I  
18 can envision and it's simple. The solutions are  
19 straightforward. There's nothing about this  
20 that I believe will interfere with the ability  
21 to reconstruct doses.

22 I don't see any surprises here.

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1 It's a very simple problem that can be easily  
2 fixed. So, in our opinion, even though we  
3 haven't seen the final product and how it's  
4 actually going to look, I don't think there's  
5 going to be any different -- in SC&A's opinion,  
6 we don't see any -- any problem with that being  
7 fixed to our satisfaction.

8 Now, so, from that perspective,  
9 right now, I guess I don't feel as if I need to  
10 see a principle. I don't need to see the final  
11 version, what that's going to look like, before  
12 I can prove it -- that you could reconstruct  
13 these doses. That doesn't mean it shouldn't be  
14 fixed.

15 Now, whether or not that's  
16 sufficient for the Work Group to recommend to  
17 the Board to deny this SEC as recommended here,  
18 that's your decision. But in SC&A's opinion, a  
19 scientifically-sound, claimant-favorable  
20 approach can be performed to reconstruct doses  
21 for all workers with a little bit of fixing of  
22 this.

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1                   MEMBER MUNN:     The only concern I  
2     have is the fact that we said so here in this  
3     Work Group, if we even say so to the Board, and  
4     recommend that follow NIOSH's position on it,  
5     then if we're queried on -- on the basis for  
6     this, we have nothing but this transcript to  
7     refer to.

8                   CHAIRMAN ZIEMER:   Well, I think,  
9     Wanda, you're suggesting that you'd feel more  
10    comfortable if we formally closed the issues,  
11    and we don't have the wording to close the  
12    issues. Let me ask a practical question here.  
13    I think Sam, you suggested there were five  
14    claimants to date.

15                  MEMBER BEACH:     I think Jim said  
16    there were two.

17                  DR. NETON:       Well, there's two  
18    active, but there were 37 total claimants in the  
19    population.

20                  CHAIRMAN ZIEMER:   And all of those  
21    have been processed except two?

22                  DR. NETON:     Yes.

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1           CHAIRMAN ZIEMER:    Okay, well, this  
2           version has been greatly overestimated.  But so,  
3           is there -- is there a pressing urgency from the  
4           petitioners that we close this very quickly?  I  
5           mean this is a fairly recent -- we've only had  
6           this report a month or two.  It looks like a  
7           fairly simple case, but we can certainly extend  
8           it another meeting if everybody's agreeable.

9           MEMBER MUNN:    It isn't that I want  
10          to hang onto it.

11          CHAIRMAN ZIEMER:    No, no.  I  
12          understand that.  I think you're looking at the  
13          general principle, saying, "Have you gone to  
14          closure on the issues?"

15          MEMBER MUNN:    I am.  I am.

16          CHAIRMAN ZIEMER:    Then that's  
17          probably a valid point.  Yes, it looks pretty  
18          simple, but we haven't formally closed, and  
19          maybe we should do that.  Josie, what is your  
20          feeling?

21          MEMBER BEACH:    That was my way of  
22          thinking, too, because we have to be

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1       accountability to the full Board.

2                   CHAIRMAN ZIEMER:     We have to be  
3       consistent.

4                   MEMBER BEACH:    Yes.

5                   CHAIRMAN ZIEMER:     So, let's agree  
6       then that we'll ask NIOSH to provide us with the  
7       responses in anticipation that we're able to  
8       close these and they stand reviewed by the Work  
9       Group.

10                  MEMBER MUNN:     I can see no reason  
11       why we could not report to the Board that we  
12       have agreed in principle in the Work Group, and  
13       we do not have the record in front of us.

14                  CHAIRMAN ZIEMER:     Sure.     We're  
15       reviewed the Bliss & Laughlin finding.   We're  
16       pretty well intending to closure.   We just need  
17       to formalize the final wording on the  
18       resolution, and we'll be set to go.

19                  MR. KATZ:     Well, if you're going to  
20       wait until the February Board meeting, I don't  
21       see any reason to -- to precipitously give an  
22       initial -- initial finding of the Work Group.

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1 You might as well wait.

2 CHAIRMAN ZIEMER: Okay.

3 MR. KATZ: And then once you know it  
4 for sure, but --

5 CHAIRMAN ZIEMER: Or even just  
6 report that we've gone through the findings  
7 matrix, and have made good progress on  
8 resolution, and we hope to report back at the  
9 next meeting with a recommendation.

10 DR. GLOVER: I'll try to do it maybe  
11 Decemberish. Do it in December, and get you a  
12 report. There's a heavy travel schedule.

13 CHAIRMAN ZIEMER: Our next meeting  
14 is going to be very much dependent on what we  
15 learn in terms of the Path Forward on GSI. So,  
16 this is -- we're probably not going to meet in  
17 December.

18 MR. KATZ: Oh, no. I wouldn't think  
19 so.

20 CHAIRMAN ZIEMER: So, yes. I don't  
21 --

22 DR. GLOVER: If I get something in

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1 December, then we have time to consider it, and  
2 you have time to read it.

3 CHAIRMAN ZIEMER: We'll be fine.

4 MR. KATZ: The next Board meeting  
5 after November is end of -- is in February. And  
6 so, that would be the one we'd be shooting for.

7 CHAIRMAN ZIEMER: It's even possible  
8 if these are fairly straightforward that we  
9 could close them by phone. I'd prefer not to,  
10 but in the interest of the Bliss & Laughlin  
11 people, because it looks like maybe early next  
12 year that we could close them by phone if we  
13 needed to. Okay?

14 MR. KATZ: Yes.

15 CHAIRMAN ZIEMER: Now, let's see. I  
16 think we've covered what we need to cover today.

17 DR. GLOVER: The issue that report -  
18 - the difference -- are you satisfied that  
19 we've closed that?

20 CHAIRMAN ZIEMER: The difference in  
21 what?

22 DR. GLOVER: About them having a

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1 different ER version. Remember there was  
2 something in your agenda here.

3 CHAIRMAN ZIEMER: I don't know what  
4 to do on that.

5 DR. GLOVER: We contacted them.

6 CHAIRMAN ZIEMER: Okay.

7 DR. GLOVER: And in fact, Dave --  
8 they faxed us the page, and Dave compared it,  
9 and it's the same thing, and I documented it.

10 MR. KATZ: They were mistaken about  
11 having a different ER version.

12 MR. ALLEN: I think what happened is  
13 she was quoting some of that, and then going  
14 straight into what she felt I meant, and it  
15 sounded like it was a quote. I think that's  
16 what happened.

17 CHAIRMAN ZIEMER: Well, we thought  
18 initially they somehow had a different version,  
19 but you --

20 MR. KATZ: I have to follow up with  
21 them, too.

22 CHAIRMAN ZIEMER: We're okay on

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1 that. Okay, any other questions? Board  
2 Members? Okay, then, we're going to adjourn our  
3 meeting. I thank you all very much.

4 MEMBER MUNN: We're not going to  
5 establish a next meeting?

6 CHAIRMAN ZIEMER: No, we can't. At  
7 the earliest we'll establish it at the Board  
8 meeting.

9 (Whereupon, the above-entitled  
10 matter went off the record at 4:33 p.m.)

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