

This transcript of the Advisory Board on Radiation and Worker Health, TBD 6000 Work Group, has been reviewed for concerns under the Privacy Act (5 U.S.C. § 552a) and personally identifiable information has been redacted as necessary. The transcript, however, has not been reviewed and certified by the Chair of the TBD 6000 Work Group for accuracy at this time. The reader should be cautioned that this transcript is for information only and is subject to change.

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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
SEPTEMBER 20, 2011

+ + + + +

The Work Group convened in the Zurich Room of the Cincinnati Airport Marriott Hotel, 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
JOHN W. POSTON, SR., Member*

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2

ALSO PRESENT:

TED KATZ, Designated Federal Official

DAVE ALLEN, DCAS

ROBERT ANIGSTEIN, SC&A

JOHN DUTKO*

JOSH KINMAN, DCAS Contractor*

JENNY LIN, HHS*

JOHN MAURO, SC&A

DAN McKEEL*

JAMES NETON, DCAS

JOHN RAMSPOTT*

*Present via telephone

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

1 (8:59 a.m.)

2 MR. KATZ: This is the Advisory
3 Board on Radiation Worker Health TBD-6000 Work
4 Group. Let's begin roll call with Board
5 Members in the room.

6 (Roll call.)

7 Very good. Welcome to all. There
8 is an agenda -- have we missed anyone on the
9 line?

10 Okay, the agenda for the meeting
11 should be posted. And there is a variety of
12 documents and I will turn this over to Paul.

13 CHAIRMAN ZIEMER: Okay, thank you,
14 Ted. We will officially call the meeting to
15 order.

16 I have a few introductory remarks
17 to make before we get into the main part of
18 the agenda. I assume everyone has a copy of
19 the agenda. I think it was sent out to the
20 petitioners. John Ramspott, I am not sure we

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1 sent you a copy or not.

2 MR. RAMSPOTT: I do have it, thank
3 you.

4 CHAIRMAN ZIEMER: Thank you. And
5 also for others who don't, if you are on the
6 line, it is on the website as well.

7 A couple of other things that I
8 distributed over the weekend just to assist
9 us. They are not really sort of official
10 documents in terms of the status of White
11 Papers and so on but I had prepared for my own
12 use what was called a GSI timeline that was
13 just to help me personally visualize both the
14 operational period and the residual period as
15 well as some sort of key events that occurred
16 during those periods such as the times that
17 various radiation sources were on the site, as
18 well as some key dates with respect to AEC
19 licenses and that sort of thing.

20 It is not necessarily an exhaustive
21 time line but it has some key items on it. I

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1 thought it might be helpful. So after I
2 prepared it, I went ahead and made copies and
3 we have provided that to the petitioner as
4 well.

5 Let me ask John, did we provide you
6 with a copy of that as well? If not, we can
7 send one to John Ramspott.

8 MR. KATZ: I think I asked Josh to
9 send copies of all these materials.

10 CHAIRMAN ZIEMER: Okay.

11 MR. RAMSPOTT: I have what I need.
12 Thank you.

13 CHAIRMAN ZIEMER: Okay. And then
14 the other thing that we distributed was
15 basically just a list of related documents
16 because we have had a lot of documents since
17 our last meeting; some NIOSH, some SC&A, some
18 from the co-petitioner. So I made up a list
19 of these. I note that over the weekend we
20 received an additional, actually three
21 documents from Bob Anigstein -- I always have

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1 trouble with the N and the G, Anigstein -- and
2 those were the transcripts of the *Matthews*
3 *versus General Steel Industries* case which was
4 apparently similar to one that may have
5 occurred at the Illinois site. And this --

6 DR. ANIGSTEIN: If I may correct.

7 It was General Steel --

8 CHAIRMAN ZIEMER: Castings.

9 DR. ANIGSTEIN: Castings, yes.

10 CHAIRMAN ZIEMER: General Steel
11 Castings at the time. And the transcripts of
12 those, actually they were three sort of
13 similar ones. I think one was an appeal, and
14 one was the main case, and one looked like it
15 was the same thing out of LexisNexis or
16 something like that.

17 DR. ANIGSTEIN: No. The LexisNexis
18 was the actual court case.

19 CHAIRMAN ZIEMER: Okay.

20 DR. ANIGSTEIN: A statement of the
21 court. The other two were to work with

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1 transcripts of the Workmen's Compensation
2 Board hearings.

3 CHAIRMAN ZIEMER: Now it didn't
4 appear to me that these three documents had
5 been available to us before. I don't know if
6 they were available to the co-petitioner
7 before.

8 DR. ANIGSTEIN: I only got them.
9 The least one I got on Saturday.

10 CHAIRMAN ZIEMER: Okay.

11 DR. McKEEL: I have not gotten a
12 copy of these.

13 CHAIRMAN ZIEMER: Okay. I just got
14 them yesterday and I think we need -- they are
15 public documents already. Is there any reason
16 we can't just email them to Dan as well?

17 DR. ANIGSTEIN: I think you would
18 have to ask the OGC people. Because since
19 they are public documents, I think they
20 contain names of people.

21 CHAIRMAN ZIEMER: They are already

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1 in the public domain.

2 MR. KATZ: I don't think it is -- I
3 think they are public domain already.

4 DR. ANIGSTEIN: Okay.

5 MR. KATZ: I think that is fine.
6 You pull them off of public sites.

7 DR. ANIGSTEIN: Will do.

8 MR. KATZ: You can absolutely send
9 them on.

10 DR. ANIGSTEIN: Okay. I can do
11 that now.

12 MEMBER BEACH: Bob, can you send
13 them to me, too? Because I don't believe I
14 got them.

15 CHAIRMAN ZIEMER: Dan, we are going
16 to email those to you right away.

17 DR. McKEEL: Thank you.

18 CHAIRMAN ZIEMER: The case is
19 remarkably similar. This is a case with a
20 plumb bob looking radium source that was
21 carried home in the worker's pocket. Very

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1 similar to the one described for us at the
2 Illinois site.

3 DR. ANIGSTEIN: Well, he didn't
4 carry it home.

5 CHAIRMAN ZIEMER: Well, he didn't
6 carry it home. He carried it around the
7 worksite in his pocket --

8 DR. ANIGSTEIN: And then --

9 CHAIRMAN ZIEMER: -- left his
10 coveralls at work.

11 DR. ANIGSTEIN: Right. Exactly.

12 CHAIRMAN ZIEMER: But in any event,
13 a very similar incident. So we will make that
14 available.

15 And then one other one that I think
16 I left off the list and that was a transcript
17 that had been provided to us earlier. I'm
18 pulling it up. Just a second here.

19 It was a transcript of GSI
20 interviews. And I think the petitioners had
21 this already and it had been distributed.

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1 Actually, it was distributed by SC&A in
2 November 2010 but I think I had left it off
3 the list. It was a draft White Paper called
4 reports of interviews with three former GSI
5 employees dated November 2010, issued by SC&A.
6 I simply left it off the list and that was
7 called to my attention.

8 So anyway, those were just
9 documents that may be helpful to as we
10 proceed. Several of them, or two of them on
11 the list, are a portion of the White Papers
12 that we are dealing with today. There also
13 are the updates on the matrices. One matrix
14 for the SEC and the one for Appendix BB, and
15 then a number of transmittals that the co-
16 petitioner sent us on related issues that were
17 of concern to the co-petitioners.

18 So just calling attention to that,
19 sort of in preparation for moving ahead here.

20 What I would like to do today is
21 begin with the White Paper that NIOSH

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1 distributed to us in early August. And that
2 has been distributed both in the non-redacted
3 form to the Work Group Members, as well as in
4 redacted form to everyone else.

5 And then we also have a White Paper
6 response from SC&A that actually was not
7 distributed to this Work Group until Thursday
8 or Friday. So we have just had a couple of
9 days and my schedule had been such that I
10 actually didn't see it until Monday and I was
11 still reading it last night. So that came in
12 very late. I know the co-petitioners have not
13 had very much chance to review that either. I
14 think the PA-cleared copy may be only cleared
15 yesterday.

16 DR. ANIGSTEIN: Yesterday.
17 Exactly.

18 CHAIRMAN ZIEMER: So none of us
19 have had a great deal of time to digest that
20 material but we do have it. And Bob will have
21 a chance to go over that with us as well.

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1 Now the NIOSH White Paper deals
2 with four modeling issues. One is the
3 exposure model for radium radiography, the
4 exposure model for St. Louis Testing, the
5 exposure model for portable X-rays and the
6 exposure model for cobalt-60 radiography. And
7 while I say that, I just want to back track
8 just a moment because I have it on the agenda
9 overview of the timeline. I just want to call
10 attention to a couple items on the timeline
11 sheet as they relate to these exposure models.

12 First of all, highlight the
13 operational period for purposes of this
14 program is January 1, 1953 to June 30, 1966
15 and then July 1, 1966 begins the residual
16 period which carries on through December 1992.

17 So in that overall time frame, the
18 radium sources are in the early part of the
19 operational period and you will see that on
20 your timeline sheet, the two radium sources.
21 Their 500 millicurie sources are shown there

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1 in the early time period.

2 You also are aware of the fact that
3 there was a replacement of the radium sources
4 in around 1962 and that showed up there. But
5 when we talk about the radium radiography, we
6 are talking about that early period up until
7 their replacement.

8 The St. Louis Testing model or St.
9 Louis Testing radiography, the dates there are
10 a little fuzzy. I have a note here that the
11 actual dates are not specified but NIOSH has
12 assumed them to be pre-1962.

13 And certainly we can have
14 discussion on that but that is what I have put
15 on the timeline as a reference. And those
16 were a 50-curie iridium and a 10-curie cobalt
17 source.

18 And then the portable X-ray
19 radiography work, you see that indicated as
20 beginning in 1964, where they obtained the
21 portable X-ray units. And I have not included

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1 the third X-ray unit here, which was a medical
2 X-ray, which would not have been suitable for
3 a radiography but would have been available
4 for things like chest X-rays and medical
5 applications.

6 And then the cobalt radiography, we
7 have the two licensed sources that replaced
8 the radium sources beginning in '62. We have
9 the 80-curie source purchased from Radionics
10 in 1968 and I have a note here because there
11 has been some worker testimony relating to the
12 possible presence of a source pre -- of either
13 this or an 80-curie cobalt source pre-1968 and
14 we might have an opportunity to have some
15 discussion on that as well.

16 I believe the co-petitioner has
17 referred to some affidavits from workers who
18 believed that there was an 80-curie source
19 earlier.

20 But in any event, that is where the
21 timeline relates. And you will notice on this

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1 timeline, that 80-curie source, if it begins
2 in '68, that is in the residual period. If
3 there was work earlier, it could have
4 overlapped back into the operational.

5 So with that sort of background,
6 just as a reference, I think we can go ahead
7 into the White Paper and hear from Dave Allen.

8 Oh, and Dan do you have a comment
9 perhaps on the timeline?

10 DR. McKEEL: I do have a comment on
11 the timeline, --

12 CHAIRMAN ZIEMER: Sure.

13 DR. McKEEL: -- please.

14 CHAIRMAN ZIEMER: You bet.

15 DR. McKEEL: There is an item on
16 there that says that the film badges were
17 available 1964 onward.

18 CHAIRMAN ZIEMER: It says film
19 badge records, not film badges.

20 DR. McKEEL: Yes, film badge
21 records.

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1 CHAIRMAN ZIEMER: Right.

2 DR. McKEEL: And I wanted to
3 mention that we had given to the Work Group
4 and to SC&A film badge records from one
5 petitioner. I mean, I will leave it to you
6 all whether we want to name names in this
7 thing.

8 CHAIRMAN ZIEMER: No. I know there
9 is one from other nuclear consultant's record
10 for one person.

11 DR. McKEEL: Well, it is beyond
12 that. In his total set of records that we
13 have, there is one report from 1963 with the
14 film badge data for all four quarters. And
15 there is a 1962 film badge report which is a
16 total data quote from 1953. So not only do we
17 have that but we have a photograph from the
18 *GSI Magazine* of another GSI radiographer. And
19 this is the *GSI Magazine* of December 1953,
20 Volume 10, number 8. And it shows clearly a
21 named GSI radiographer with a film badge on

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1 his belt.

2 So you know we have photographic
3 documentation that there were film badges worn
4 before 1964 and we have records that show that
5 there were film badge readings before 1964
6 dating back to 1953 that haven't been found.

7 CHAIRMAN ZIEMER: Yes.

8 DR. McKEEL: And on one of the
9 records of this person, as you know, it is
10 noted that Nuclear Consulting Corporation was
11 involved in that film badge report. And I
12 just need to, we made this point many times
13 for the record, but I need to do it again here
14 today, that NCC was purchased by Mallinckrodt
15 Chemical Works.

16 CHAIRMAN ZIEMER: Right.

17 DR. McKEEL: And we believe that
18 the petitioners, the fight experts believe
19 that NIOSH should make, NIOSH, the Board,
20 SC&A, should make a diligent effort to seek
21 those film badge reports among the

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1 Mallinckrodt Chemical Work records. And to my
2 knowledge that has really not been done.

3 But it would be logical if
4 Mallinckrodt bought NCC, then it would also
5 have purchased its intellectual records and
6 film badge records. And those records might
7 have survived among the Mallinckrodt data
8 sets.

9 So that is just a friendly
10 emendation to you.

11 CHAIRMAN ZIEMER: Well I appreciate
12 that, Dan. I think that is very helpful.

13 I had put a note in here in 1962 in
14 the Nuclear Consultants' survey itself refers
15 to both the use of film badges as well as
16 dosimeters.

17 And I had gone back and read the
18 biography of the person who prepared the
19 license applications when they got the cobalt
20 sources and looked at his training. I think,
21 I am trying to remember off the top of my

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1 head, his training started back in 1942
2 actually. And he identifies the use of film
3 badges and dosimeters in his training and
4 implies that he used in practice the methods
5 he used in the training, which included the
6 use of personal dosimeters.

7 And I think it reinforces what you
8 are saying that it is very likely that there
9 were film badges beginning in the operational
10 period early on, as evidenced by the
11 photograph.

12 And I know you have indicated to us
13 before that it is very likely those were
14 nuclear consultants or their predecessors and
15 that they had been bought by Mallinckrodt.

16 DR. McKEEL: Well the other thing
17 is that just recently John Ramspott re-
18 interviewed the worker that we referred to
19 that had the most voluminous pre-1964 film
20 badge report. And I believe, as relayed to
21 me, his quote at this point was he wore film

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1 badges from day one. And he was there in the
2 early 1950s and then left for a while and came
3 back in 1956. So if there is a need to have
4 additional input on this, then that gentleman
5 could be re-interviewed at that point.

6 But I think it is clear from
7 everything we have said that there were
8 reports and film badges in the early period.
9 We just haven't found them.

10 CHAIRMAN ZIEMER: Right. And at the
11 moment, the fact that film badges were in use
12 at least speaks to the issue of whether or not
13 there was a radiation protection program in
14 place in the early years. There have been
15 some sort of, well I think, differences of
16 opinion as to whether or not there was a
17 viable radiation safety program prior to the
18 AEC licensing period. It certainly appears
19 there was, based on both the statements made
20 and the biographical information and the
21 photographic information.

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1 But the only thing I was referring
2 to on the timeline was Landauer records. And
3 you're right. I think some of these showed up
4 as having late 1963 dates but for practical
5 purposes, we have the records from essentially
6 1964 to 1973. But in any event, those are the
7 records. We don't have the earlier records
8 and that is an important point to make.

9 DR. McKEEL: There is one other
10 item that I have that you might want to think
11 about adding. It included under your timeline
12 and that is that in the NIOSH Allen White
13 Paper, the latest one and in Dr. Anigstein's
14 reply I believe most of them adhere to the
15 line that the only iridium-192 source was
16 owned by St. Louis Testing.

17 And the same gentleman with all of
18 the film badge records prior to 1964 just
19 reconfirmed to Mr. Ramspott again that it is
20 his firm recollection, and he could be
21 interviewed on this point again, that GSI

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1 owned an iridium-192 source that he used. And
2 he now places that starting in 1956, after he
3 had left the company and returned for a while.

4 So I think on the timeline there
5 should be at least a notation that based on
6 eyewitness testimony from at least worker,
7 that there was a GSI iridium-192 source. And
8 I just don't want to let that get lost in the
9 shuffle.

10 CHAIRMAN ZIEMER: Yes. And
11 actually, Dan, I had prepared and was going to
12 introduce us to, Dan, and made a list,
13 although you could do it yourself, I have a
14 list of co-petitioners' concerns. And one of
15 those on my list, it is the fourth concern,
16 use of iridium sources owned by GSI in the
17 early covered period.

18 So I acknowledge that you have
19 raised this point to us. I didn't put it on
20 the timeline. Perhaps I should.

21 I also want to point out, because I

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1 have reread some of the early affidavits, and
2 looking at the affidavit of, -- I'll get the
3 date here, hang on -- August 11, 2006. This
4 was the meeting you held with the workers, Dr.
5 McKeel. There is testimony from one of the
6 workers that says that the iridium source was
7 not owned by GSI but it was owned by St. Louis
8 Testing. And --

9 DR. McKEEL: Well that is
10 conflicting testimony.

11 CHAIRMAN ZIEMER: Yes. And I will
12 be glad to read the transcript, I have a copy
13 of it here, that says that -- maybe I will
14 just read it now. It is on page 57 of that
15 transcript. And McKeel says, quoting:
16 "[Identifying Information Redacted], you said
17 now we have also heard that there was an
18 iridium-192 source. You are doubting that.
19 Is that right?" And I won't name the person,
20 but he says: "Yes, that was [Identifying
21 Information Redacted] --" is that the right

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1 name? [Identifying Information Redacted],
2 [Identifying Information Redacted]. Here is
3 what it says: "Yes, that was [Identifying
4 Information Redacted]. He came over from St.
5 Louis Testing and brought the iridium source
6 with him." And then McKeel says "Okay."

7 DR. McKEEL: I understand that.

8 CHAIRMAN ZIEMER: Yes. So I'm
9 saying there is conflicting testimony about
10 that. Certainly there was an iridium source in
11 use but we are in that sort of situation where
12 there is conflicting testimony about who used
13 it. It is not clear to me --

14 DR. McKEEL: Well it is the same
15 individual, though. And yesterday -- I mean,
16 over the weekend he said to Mr. Ramspott
17 again, that he thought it was owned by GSI.

18 So all I am suggesting is we don't
19 have to go back to 2006 transcripts or even
20 what I say this morning. It could be, he
21 could be re-interviewed on that particular

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1 point and somebody on the Board make their own
2 judgment --

3 CHAIRMAN ZIEMER: Yes.

4 DR. McKEEL: -- you know, where the
5 truth lies. I don't know.

6 CHAIRMAN ZIEMER: Yes. Well, okay.

7 DR. McKEEL: Some of the things we
8 have been through we don't have information.
9 And you know, it is hard to prove or disprove
10 one way or the other.

11 MR. RAMSPOTT: Dr. Ziemer, this is
12 John Ramspott, if I can correct something.

13 CHAIRMAN ZIEMER: Sure.

14 MR. RAMSPOTT: The [Identifying
15 Information Redacted] you are referring to was
16 the manager over the betatron. He is now
17 deceased. That is a [Identifying Information
18 Redacted] last initial B as in boy.

19 CHAIRMAN ZIEMER: Yes, that is
20 correct.

21 MR. RAMSPOTT: And the Jim who was

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1 a licensed isotope, all the photographs, all
2 the badges, is a [Identifying Information
3 Redacted] as in Paul.

4 CHAIRMAN ZIEMER: Yes, okay.

5 MR. RAMSPOTT: He is the gentleman.
6 There are two different [Identifying
7 Information Redacted].

8 CHAIRMAN ZIEMER: Two different
9 ones.

10 MR. RAMSPOTT: One was a manager of
11 the betatron. The other one was an actual
12 isotope operator/user with the records. And
13 he is definitely available for re-interview.

14 CHAIRMAN ZIEMER: Okay. Well, we
15 won't be able to resolve that today but at
16 least we have that information on the record.

17 MR. RAMSPOTT: Yes, there were two
18 other [Identifying Information Redacted].

19 CHAIRMAN ZIEMER: Thank you. Other
20 comments?

21 DR. ANIGSTEIN: Yes, I would like

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1 to.

2 CHAIRMAN ZIEMER: Bob.

3 DR. ANIGSTEIN: Right. First of all
4 in terms of how far back the film badges go,
5 we have from the AEC, from all the AEC
6 records, that in order to get their license,
7 they put in rather, from my perspective,
8 effective, extensive radiation controls. And
9 that included bringing in, for the first time,
10 this Nuclear Consultants Corporation.
11 [Identifying Information Redacted] was the
12 head of it and he was, probably at that time,
13 not too common, John, a CHP back in 1962. A
14 Ph.D. physicist and a CHP. So we are talking
15 with somebody at a minimum a qualified
16 professional. And he became essentially their
17 radiation safety consultant.

18 And his company did their own film.
19 The data is only like two film badge
20 processors. At that time there were probably
21 many mom and pop stores and they did their own

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1 film badges. Whether they sent them out to
2 someone like Mallinckrodt to process, but they
3 were responsible for them and they kept the
4 records, which I am confirming what Dr. McKeel
5 says is entirely correct.

6 And the records that Dr. McKeel
7 furnished to us of this one worker
8 [Identifying Information Redacted], who has
9 just been identified, what it shows is his
10 record starts off he worked for a different
11 company. At one point he must have been
12 moonlighting because he also worked with
13 something called Pittsburgh Testing and there
14 were no records. This is his AEC Form 4,
15 which is still in use. Now it is called the
16 NRC Form 4 and it is made up for the benefit
17 of the worker and his employee to show his
18 cumulative record. Because at that time, you
19 had this rule of 5 n minus 18 and so you had
20 to know his history.

21 But it is sort of irrelevant. He

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1 worked for four months, for two quarters, with
2 this Pittsburgh Testing and he was simply
3 given the maximum dose of 3.75 rems per
4 quarter. There were no records. He was just
5 assigned that dose.

6 And then there was this very
7 peculiar entry. It says General Steel
8 Industries 2/2/53 to present, present being
9 the date it was issued, 3/19/62. And I
10 interviewed this gentleman before it was sent
11 out. And it says 18 quarters. First of all,
12 I was puzzled. Well he was with GSI, then
13 called General Steel Castings, not as a
14 radiographer. Then he went into the army. He
15 came back two years later and then he became a
16 radiographer.

17 So the film badge, I mean they
18 covered a period of almost ten years, like
19 about nine years, and yet it says 18 quarters.
20 Apparently that was only the time that he was
21 actually employed.

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1 He was given a dose, assigned a
2 dose of 9.1 rem. The basis simply says
3 record. It does not say film badge. And the
4 reason I know that is distinct from film badge
5 is the next page shows his actual records for
6 the year, the calendar year 1963, which was --
7 I don't see that here, but somewhere I saw
8 that. So the other one was for '62. This one
9 maybe it was 1962. And here, it gives those
10 very small doses of 15, 5 millirem per quarter
11 and the basis says FB, meaning film badge.

12 So they made a distinction. There
13 was a film badge program -- yes, I'm sorry.
14 It says 1963 right here.

15 So in 1963, this confirmed there
16 was a film badge program, which we already
17 know from the AEC records. And it also, to my
18 mind, confirms that the earlier were not film
19 badge because why wouldn't they say film badge
20 or FB. And it simply says record, without any
21 explanation of what the record was.

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1 CHAIRMAN ZIEMER: Well let me give
2 you a partial answer to that because in those
3 days, everybody, and this was a new AEC rule
4 at that time, you had to get the lifetime
5 history.

6 So you went to the place where the
7 person worked before and asked them to send
8 you the accumulated dose that they had. You
9 didn't know how they obtained it.

10 DR. ANIGSTEIN: It was all the same
11 employer. This is all General Steel.

12 DR. NETON: Well there could have
13 been pocket dosimeters.

14 DR. ANIGSTEIN: They may have had
15 pocket dosimeters.

16 CHAIRMAN ZIEMER: Oh, I see what
17 you are seeing.

18 DR. ANIGSTEIN: But I mean, it is
19 unlikely.

20 Okay and the photograph that Dr.
21 McKeel refers to, I remember seeing. And that

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1 was, you know the company had its own little
2 publicity. They would put out little
3 leaflets, press releases, the company
4 magazine. And I remember seeing, this was
5 actually John Ramspott and his late wife had
6 put together this nice --

7 CHAIRMAN ZIEMER: Book. Oh, yes.

8 DR. ANIGSTEIN: -- book. And I
9 just remember one page said General Steel
10 Castings or GSI employees qualify as AEC
11 radiographers. And it showed a photograph of
12 them, the first class, so to speak, and they
13 were wearing, naturally, they were wearing
14 film badges. That was the cobalt era. That
15 was after they got the --

16 CHAIRMAN ZIEMER: I think the
17 picture Dan is referring to is a different
18 one.

19 DR. ANIGSTEIN: Oh.

20 CHAIRMAN ZIEMER: Dan, you can
21 correct me on this but I believe it was a much

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1 earlier photo.

2 DR. McKEEL: It is a picture of
3 this worker standing in front of the GSI
4 betatron control panel. And I gave you the
5 Volume, the issue and so forth. It was in
6 1953. That other photograph of all the
7 radiographers was much later.

8 Anyway, if I could return back to
9 [Identifying Information Redacted] The record
10 must be correct. And so I have another
11 report, after the one that Dr. Anigstein just
12 talked about that has Nuclear Consultants
13 Corporation. By the way, it has Nuclear
14 Consultants Corporation Number 110 is actually
15 what is written on there.

16 CHAIRMAN ZIEMER: Right.

17 DR. McKEEL: So whether the number
18 110 is a badge number -- it could be. If we
19 had the record we might know that.

20 But anyway, the next page that I
21 have, was obtained from [Identifying

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1 Information Redacted] himself, has 1962 and
2 then it has monthly gamma totals in Box 9.
3 Box 9 is gamma. It said dose for the period
4 in millirem. It has got 11 to 131.40 with a
5 total for the quarter, a total for the next
6 quarter. So there are 12 dose readings that
7 total a grand total of 135 millirems for that
8 period of time.

9 Now, I just have to say I believe
10 that is the way they reported film badge data.
11 And I think that is film badge data and I
12 think it is from 1962.

13 Oh, I'm sorry. It says method of
14 monitoring. This is in Box 7, ET. Film Badge
15 is FB; pocket chamber PC; calculation calc. ;
16 and under gamma, the entry is F dot B dot. So
17 the 1962 data, 12 monthly readings is film
18 badge data.

19 So that ought to lay that issue, I
20 think to rest. And I think on the first
21 report where they report a total of 9.1 rems

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1 over 18 quarters from 2/23/53 to the present
2 is true that that doesn't say exactly when
3 those readings or records were obtained but
4 since the data is 3/19/62, if you go back 18
5 quarters, that is four and a half years.
6 Let's say they were all just before 1962, that
7 would take you back to 1958.

8 CHAIRMAN ZIEMER: Right.

9 DR. McKEEL: And we do know that
10 [Identifying Information Redacted] came back
11 in about 1956, or that is what he said
12 yesterday. And that is when he said the
13 iridium source owned by GSI was at GSI and he
14 used it.

15 So, you know, I personally don't
16 see any other way to interpret that data.

17 MR. RAMSPOTT: Paul, this is John
18 Ramspott. Can I add one more thing on this?

19 CHAIRMAN ZIEMER: Yes, go ahead,
20 John.

21 MR. RAMSPOTT: In talking to

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1 [Identifying Information Redacted] yesterday
2 and in just listening to Dr. Bob with the
3 [Identifying Information Redacted],
4 [Identifying Information Redacted] had never
5 heard that name before, did not know
6 [Identifying Information Redacted] also,
7 [Identifying Information Redacted]'s program.
8 I think Bob just had started in '62. The
9 iridium that Jim was talking about was there,
10 to his best recollection, '56 to '57 era. So
11 [Identifying Information Redacted], I'm sure
12 in putting the other strict guidelines, what
13 have you, would not have been involved with it
14 at all. He hadn't even come on the scene yet.
15 And I think that is kind of important.

16 The other thing and maybe somebody
17 can help me here, but in reading when did the
18 source licensing begin for all companies? I
19 thought I read that happened under an Act in
20 1959. And I might add Illinois was a non-
21 cooperating state or non-participating state

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1 with the AEC at that time, too.

2 CHAIRMAN ZIEMER: Well AEC licenses
3 go back well before '59. There was a type of
4 licensing program at the time when
5 radioisotopes were first distributed, and
6 those came out of Oak Ridge, actually, and
7 those first shipments were back in the '40s.
8 The first shipment went to the Bernard Cancer
9 Institute in St. Louis. And on that same day,
10 a shipment came to Purdue University. So I
11 had records of that early, what was the
12 forerunner of a license.

13 Now later on in the early '50s,
14 they developed what are called broad licenses
15 or institutions that have multiple sources.

16 But the licensing program, the
17 thing was that prior to '62, and this is one
18 of the issues with that, with the presence of
19 iridium or the ownership of iridium and a
20 large cobalt source. If that occurred prior
21 to '62 and even in the early '50s, you would

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1 have the issue of how could it have gotten
2 there without an AEC license. And the
3 license, it was two ways. The supplier had to
4 confirm that a license existed before they
5 shipped to anybody. So that is one of the
6 dilemmas. But the licensing didn't begin in
7 '62. It goes way back.

8 MR. RAMSPOTT: Okay, that was a
9 question I didn't know the answer. That's why
10 I asked.

11 DR. McKEEL: This is Dan McKeel
12 again. My input on that is we talked around
13 this issue about the iridium-192 licensing.
14 One of the most straightforward things that
15 could be done that has not been done, as far
16 as I am aware, is nobody has yet sought out to
17 see the iridium-192 license that St. Louis
18 Testing Company had. And you know, so
19 everybody seems to accept that that was used.
20 And I know that is what that president said.

21 So you know, that should be readily

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1 available. I believe that Mr. Ramspott and I
2 have asked [Identifying Information Redacted]
3 that and it just wasn't forthcoming. I'm not
4 sure we asked vigorously enough. But anyway,
5 that is another living person that could
6 potentially contribute to what kind of
7 iridium-192 license.

8 And in fact before everybody starts
9 simply accepting that there was a 50-curie or
10 whatever size you want to assign to their
11 source, we ought to look at the license and
12 see. And there are records that could be
13 gotten, potentially, and have not even been
14 sought that I am aware. So I am suggesting
15 that that would all be appropriate to do.

16 CHAIRMAN ZIEMER: Okay. Good
17 point, Dan. Thank you.

18 DR. McKEEL: Okay.

19 CHAIRMAN ZIEMER: Yes. Let's go
20 ahead with those preliminary comments on the
21 timeline and some of the uncertainties that

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1 have arisen in terms of who owned want. Let's
2 look -- We do know that there were two radium
3 sources. And those radium sources were used
4 for radiography. The date which they stopped
5 using them is fairly well established. They
6 were replaced by cobalt sources.

7 NIOSH has proposed a methodology
8 for, in essence, bounding exposures from the
9 use of the radium sources. And then SC&A has
10 raised some concerns and issues about the
11 NIOSH methodology.

12 So let's hear first from Dave Allen
13 and have an opportunity to go through that.
14 And then we will hear from Bob, SC&A's view.

15 And Dave, if you have any
16 preliminary remarks before you get into the
17 radium, that is fine or any introductory
18 things you want to talk about in terms of sort
19 of the overall approach to what you are doing,
20 that is fine, too.

21 MR. ALLEN: No, I think -- Do you

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1 want me to go through just how the exposure
2 model developed for the radium source?

3 CHAIRMAN ZIEMER: That would be
4 fine, sure.

5 MR. ALLEN: Okay, it started with
6 records from, let me get the dates right here,
7 1962 AEC inspection. Some of those records
8 mentioned the utilization sources. At that
9 point, it was the cobalt sources. But just
10 when the cobalt sources first started right
11 after the radium era, it has been mentioned
12 before and it is in the documentation that the
13 site switched over from the radium sources to
14 the small cobalt sources because the State of
15 Illinois essentially insisted that they did.
16 They wanted them to stop using the radium
17 sources. There was no information indicating
18 that there was any change in production or
19 change in policy on how much testing they did
20 or anything that caused that change over.

21 So the assumption in this paper is

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1 that the case that they would be doing
2 radiography with those small sources is
3 consistent with the radium. And from those
4 reports, utilization was about 30 percent of
5 the time. They were using the sources, which
6 came out to 144 minutes per eight-hour shift.
7 And that was our basis for how long the
8 sources were exposed. It was also mentioned
9 that the amount of time per shot, most of the
10 shots being short, one or two minutes, with
11 some as long as 70 or one of the reports I
12 think said an hour and a half.

13 So based on that we estimated I
14 believe it was ten shots per shift on average,
15 one long one and several short ones. And for
16 each shot they were using a fishing pole
17 technique, according to the document, the
18 license application. So we made an estimate
19 for what kind of dose they would get using the
20 fishing pole technique, placed the source and
21 then doubled that for removing the source.

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1 And then also the boundary dose,
2 they would also be getting a dose while the
3 shot is going on at the boundary, whatever
4 boundary they established. We used the report
5 from one of the workers who talked to another
6 worker who said that they had done shots in
7 the open area outside the radiography room in
8 building six, that they would rope off an area
9 one and a half times the required distance.
10 And based on that, we assumed for the entire
11 shot, the way the radiographer was standing at
12 the boundary for that.

13 It was the report of cobalt time
14 but again, in this one we were assuming that
15 they were using the same practices when they
16 did that that they would have been using when
17 they were using the rating.

18 Based on all of that, we came up
19 with an estimate for the radiographers for
20 placing the sources, taking them back out of
21 there, and for the time they would have spent

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1 by the boundary waiting for the shot to be
2 done and came up with I believe it was 3,573
3 millirem per year.

4 We also went ahead after that and
5 started looking at other people, other
6 workers, non-radiographers. The same report
7 that said they roped off an area one and a
8 half times the required distance, also said
9 that the radiographers would leave the area
10 and people would walk through that boundary.

11 In a previous White Paper we did an
12 estimate of what kind of dose somebody would
13 get walking through the boundary and that was
14 included in this one. We assumed that it
15 could only happen during the long shots
16 because to get a clear picture for a one
17 minute radiographer, I mean you have pretty
18 much got to stay there and take it out at the
19 right time. But for the longer ones, it is
20 physically possible, at least, for somebody to
21 walk away and come back.

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1 So we assumed it was for the one
2 longshot per shift, that they walked through
3 the area a varied distance and came up with an
4 average, depending on how far they cut across
5 this area. And for the remainder of the time
6 we assumed that they were working right next
7 to the boundary, too, where their normal work
8 area was. So it was an attempt to be a
9 bounding estimate.

10 And then we also looked at who
11 would not be subject to this boundary, who
12 would be overhead crane operator and anybody
13 working the roof. And again we tried to do an
14 estimate that was assuming this source, if it
15 is outside this radiography room, could be set
16 up anywhere. And a person on the roof could
17 be working anywhere on the roof and the same
18 with a crane was what we essentially made in
19 this paper. And so then we just did
20 essentially an average exposure times the
21 amount of utilization time for the sources,

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1 etcetera, to come up with an estimate for the
2 crane operator and for the roof, get somebody
3 working on the roof.

4 You want any more on the radium?
5 That is essentially how we have done the
6 radium.

7 CHAIRMAN ZIEMER: No, I want to
8 concentrate on the radium first and then we
9 are going to talk about the sources.

10 Let me ask the Work Group Members
11 if they have any questions on Dave's
12 methodology.

13 MEMBER MUNN: No. It seemed very
14 clear to me.

15 CHAIRMAN ZIEMER: I want to make
16 one comment on the issue of why radium work
17 stopped and Bob, I want to sort of raise this
18 with you as well. Because I think there is a
19 statement in the critique that suggests that
20 the radium work was stopped because it was
21 dangerous. But I want to point out to make

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1 sure everyone is aware of what was going on at
2 that time in the U.S. with radium sources.
3 Radium sources were not just terminated at
4 GSI. Use of radium sources were terminated
5 throughout the State of Illinois and every
6 other state that had the state program.
7 Indiana was the same way. It was not just
8 radiography. It was medical sources.

9 You have got to remember at that
10 time period radium was still the main therapy
11 source used in nuclear medicine and in
12 therapy.

13 MEMBER MUNN: Almost all hospitals
14 had them.

15 CHAIRMAN ZIEMER: All hospitals had
16 their big inventories of radium sources. And
17 the radium source usage was halted in the U.S.
18 and that was based primarily on the fact that
19 radium was notorious for leaking. Field
20 sources were leaking and people found this all
21 the time. I had first-hand experience with

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1 it.

2 And the U.S. set up a program where
3 they provided for radium users repositories
4 where you could send these sources. I think
5 the Bureau of Rad Health was one of the early
6 ones that just collected sources from people.

7 So in that sense, radium was
8 thought to be dangerous in that it had the
9 potential for leaking. That was the main
10 thing. It was a problem for medical people
11 because all of the old medical charts, the
12 Edith Quimby treatment charts which everybody
13 used in the U.S. were based on, I think, I'm
14 trying to remember now, was like a milligram-
15 hours of radium use or something like that.
16 But anyway everybody was using radium. So
17 suddenly it is being stopped everywhere and
18 the sources are being collected.

19 Now I think you can superimpose on
20 that for the radiographers there was another
21 issue and that is the use of the fish pole

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1 technique. And this is a technology thing and
2 this was just used everywhere because by '62
3 we not only had cobalt and iridium but we had
4 technology which included pneumatic tubes and
5 mechanical cranking. We had ways to bring
6 sources in and out of shields so that you
7 didn't have to do the fish pole. This is
8 everybody.

9 So I just wanted to make sure that
10 we don't assume that the switch implied that
11 there was a lack of radiation protection
12 efforts at this facility. There may have been
13 but the switch is not the reason for it. The
14 switch, if they had the best practice and if
15 you had all the records that showed yes or no
16 they stayed below limits, whatever it was,
17 they would have to switch anyway. That was
18 what was going on at that time in the U.S.

19 DR. ANIGSTEIN: I have two comments
20 on that. One is possibly for the reason, GSI
21 did not own the radium source. They leased

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1 them. And I would guess the reason they
2 leased them interpreted that very thing. They
3 didn't have to worry about the leak thing. It
4 would be the company that owns the source.
5 They would go back and forth.

6 CHAIRMAN ZIEMER: Well, --

7 DR. ANIGSTEIN: I had an experience
8 in New York City I will just be brief. We
9 briefly interviewed a safety officer from
10 Maimonides Hospital and they were still rather
11 far behind times using radium or creating
12 uterine cancer but every time a patient would
13 come in or they were going to have a patient
14 come in, they would simply order the sources,
15 I think probably from U.S. Radium in New
16 Jersey. And they would get them and use them
17 and send them back. So again, they didn't have
18 to worry about the leakage, the owner did.

19 And they specifically said in the
20 letter from GSI to AEC the State of Illinois
21 ordered us or requested that we stop using the

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1 fish pole technique. They didn't say stop
2 using radium. They simply said the fish pole
3 technique specifically was asked to terminate.
4 And there are currently, I have a list now,
5 six or eight states where I am going to have
6 to search, all the state regulations where
7 they mentioned fish pole specifically saying
8 it is either prohibited or they need special
9 permission.

10 CHAIRMAN ZIEMER: Right.

11 DR. ANIGSTEIN: So they didn't say
12 radium. They weren't singling out radium.
13 They were simply saying don't use the fish
14 pole technique.

15 CHAIRMAN ZIEMER: Well that's why I
16 said they said both. There was both going on.

17 DR. ANIGSTEIN: The radium leaking
18 --

19 CHAIRMAN ZIEMER: The fish pole
20 technique was being terminated for
21 radiographers. The use of radium was being

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1 terminated for all radium users. So both of
2 those things pretty much coincided.

3 DR. MAURO: And the time frame, are
4 you ready to mention when did this transition
5 occur?

6 CHAIRMAN ZIEMER: The early '60s.

7 DR. MAURO: The early '60s.

8 CHAIRMAN ZIEMER: Right then. I
9 mean, I had radium sources to get rid of when
10 I first went to Purdue. When I went there in
11 '59, we still had radium sources. About the
12 only -- well even the moisture gauges, which
13 used to be radium beryllium to produce
14 neutrons from moisture, those got replaced by
15 polonium beryllium. And so this was
16 happening.

17 And my only point was not to read
18 in more to say okay, this proves that they had
19 an inadequate radiation safety program. I
20 don't think -- that point doesn't prove that
21 they did because they would have had to do it,

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1 even if they had a super program. So that is
2 more of an historical event. They had to
3 switch. They would have been required
4 regardless. And I think we all know the fish
5 pole technique was not the best technique to
6 use.

7 MEMBER MUNN: No.

8 CHAIRMAN ZIEMER: People did it.

9 MEMBER MUNN: But the mechanical
10 robotic technology was just beginning to be
11 effective at that time. Prior to that time,
12 it was sketchy at best. But they really had
13 --

14 DR. ANIGSTEIN: In case anyone
15 missed it, here is the illustration of the
16 fish pole technique.

17 CHAIRMAN ZIEMER: Right.

18 DR. ANIGSTEIN: Here is the typical
19 radium source that actually John Ramspott just
20 found.

21 CHAIRMAN ZIEMER: For people on the

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1 phone, we are looking at the pictures. I
2 think these were in the report, in Bob's
3 report, showing the fish pole technique --

4 DR. ANIGSTEIN: Right.

5 CHAIRMAN ZIEMER: -- as well as the
6 plumb bob sources.

7 DR. ANIGSTEIN: And you know, the
8 lack of -- well here is your radiation safety.
9 "Radium -- Danger -- Keep Out."

10 For those who follow signs and the
11 worker standing there and I made the point
12 that even though the worker identified as
13 [Identifying Information Redacted] said well
14 he held the pole about six feet away, there
15 seems to be a distance of even less than four
16 feet in the picture.

17 And here, once he lifts it out, it
18 is going to be close to his body. Now he
19 swings it out at the end of that stick.

20 So this is not strictly a fish pole
21 because it is not on a string. A fish pole is

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1 on a hook and a string. But it is similar.

2 Also, I did a study of the work on
3 the timeline of the State of Illinois
4 radiation control. And up until about 1957,
5 they had no authority over radiation
6 whatsoever. Then by '59, there was enabling
7 legislation that gave the Department of Public
8 Health responsibility for radiation control.
9 But they did not actually issue -- or some
10 government agency, bureaucratic agency's work.
11 They didn't actually issue regulation on
12 radiation from 1961. That was the earliest
13 one at least I asked them for the regulation
14 and that was the earliest one they could find.

15 So in '61, they issued regulations.
16 They have a whole state all of a sudden to
17 look at. And my suspicion, my conclusion,
18 inference is that early '62 is when they first
19 got around to checking GSI and finding out
20 that they had the radium and were using it,
21 and that they immediately ordered them to

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1 stop.

2 So the reason for it were simply
3 legal and jurisdictional. They didn't even
4 have jurisdiction prior to that.

5 CHAIRMAN ZIEMER: Right. Well --

6 DR. ANIGSTEIN: I think it was a
7 technique. Again, not to be argumentative,
8 but it was a technique rather than the radium
9 that they were concerned about. Because I
10 would assume with leasing sources that they
11 would periodically get rotated. I don't think
12 you would have the leakage problem.

13 CHAIRMAN ZIEMER: Well, they would.
14 It didn't matter whether you leased or owned.
15 Everybody had to get rid of radium sources.

16 DR. ANIGSTEIN: Oh, okay. I'm
17 sorry.

18 CHAIRMAN ZIEMER: It made no
19 difference. Even if you leased, depending on
20 your lease arrangement, you could do your own
21 leak testing or not. Or they could provide

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1 it, in terms of -- I don't think that matters
2 so much. It is just --

3 DR. ANIGSTEIN: In 1972 Maimonides
4 Hospital was still using them.

5 CHAIRMAN ZIEMER: Oh, yes.

6 DR. ANIGSTEIN: Again, renting.

7 CHAIRMAN ZIEMER: Well one reason
8 people rented radium sources was radium used
9 to be very expensive, very expensive. If you
10 go back to the time when Madame Curie made her
11 trip to the U.S. and received as a gift a gram
12 of radium, they had a big fund raising drive
13 to buy that source.

14 DR. ANIGSTEIN: Madame Curie got a
15 curie.

16 CHAIRMAN ZIEMER: That's exactly
17 right. She got a gram of radium as a gift
18 because it was so expensive.

19 I mean, we are diverting. I think
20 we want to hear, Bob, more of the critique of
21 the model, as opposed to --

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1 DR. NETON: Bob, that fish pole
2 technique, that is not from GSI, is it? Or is
3 it?

4 DR. ANIGSTEIN: No. No.

5 DR. NETON: So that is just an
6 example of --

7 DR. ANIGSTEIN: 1941 I think was --

8 CHAIRMAN ZIEMER: I don't think we
9 should assume that this is what GSI's fish
10 pole was.

11 DR. NETON: No, we had workers say
12 he was four to six feet away. You have an
13 example where it is closer.

14 DR. ANIGSTEIN: Yes, that's
15 exactly. I am just saying --

16 DR. NETON: I just wanted to point
17 that out.

18 CHAIRMAN ZIEMER: Yes.

19 DR. ANIGSTEIN: I am saying that
20 here are the only pictures I have and do I
21 question these? It may have been -- you know,

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1 when you are looking at a recollection five
2 years later --

3 DR. MAURO: By way of context, I
4 know we are discussing what is factual, where
5 it might be a little speculative, and what is
6 uncertain. And I think it is always very
7 important to try to get the facts right and
8 that is what we are trying to do right now.

9 But I also would like to point out
10 that some of the facts are not directly
11 relevant to the SEC issue. It is nice to know
12 what size the source was, whether the fish
13 pole was three feet or four feet, all of which
14 is factual information which goes towards
15 modeling. And I think we are going to find, I
16 am just saying all this as a preface, that we
17 are going to find -- I always make a
18 distinction in my mind regarding yes we can
19 model it, it is just a matter of agreeing on
20 the assumptions or we are never going to
21 really know whether we can model it or not

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1 because there are aspects of the behavior and
2 the activities that took place at that time
3 that we really have no way of placing any
4 values on it that we consider to be
5 reasonable.

6 So it is important to keep a
7 distinction between these two types of
8 concerns. I think most of the things we have
9 been discussing so far is to try to get the
10 facts right so that we can talk about models
11 in a way that we can say yes, we can model
12 this with some degree of precision.

13 I think you are going to hear, I
14 think Bob is going to point out both sides,
15 namely questions that relate to whether or not
16 we would model it that way but also questions
17 to other aspects of the whole problem, this
18 classic problem that makes it difficult to
19 model at all.

20 CHAIRMAN ZIEMER: Sure. Go ahead,
21 Bob.

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1 DR. ANIGSTEIN: Well, I don't know
2 if Dave wants to finish. Is Dave finished
3 with the radium?

4 MR. ALLEN: Yes.

5 DR. ANIGSTEIN: Okay, so this is
6 basically SC&A's response.

7 And first of all, just mindful of
8 what John just said but still looking at the
9 model, we are working from the same
10 information and we approach it differently.
11 And that is, we came in favorable I would say,
12 and we had showed the photographs, is those
13 two photographs it looked like it was fairly
14 close to the body. So I would go with the
15 range of four to six feet but I would pick the
16 four feet to be more claimant-favorable and,
17 in my mind, maybe even more plausible. It
18 makes a difference, you've got the exposure,
19 the inverse square law. So NIOSH correctly
20 calculated 15 mR per hour for the pipe width
21 per distance and using the same methodology,

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1 we get 23 mR per hour.

2 Again, exposure duration, the
3 gentleman said 12 to 15 seconds. I would pick
4 the 15 second rather than the mid-point again,
5 to be claimant-favorable.

6 And the result is you would get, we
7 concur with the NIOSH assumptions because they
8 are straight out of the AEC records of 30
9 percent; ten exposures per shift and 30
10 percent utilization, 30 percent of the time.
11 And our calculation is 9.39.

12 Now this is just from the taking
13 the source out of the pig, placing it in the
14 casting, and then retrieving it at the end of
15 the exposure. They got 2.7 not only with
16 different assumptions, but also it seems with
17 just an assumption not based on evidence that
18 there were two radiographers, that these ten
19 exposures were done by not one radiographer
20 but two radiographers. So each got half the
21 dose from this part of the scenario.

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1 Where we differ the most is the
2 assumption of what happened to the
3 radiographer and to the other workers while
4 the sources were sitting there by
5 radiographing the castings. And I think there
6 is a misinterpretation of the worker who
7 participated, he is not on the phone now so I
8 won't name his name, but who participated. A
9 former radiographer who participated a number
10 of times in our Work Group meetings. And he
11 described, and I am now going from memory but
12 in my report it is verbatim taken from the
13 content, I talked to a supervisor over at
14 Isotopes who told me that they would mark off
15 an area -- they were using the cobalt source
16 because he wasn't even there during the radium
17 time. He wasn't hired until after they began
18 cobalt. That they would mark off an area. It
19 would survey two mR per hour and then mark off
20 an area one and a half times that distance.

21 And then when Paul asked well what

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1 was the distance, his answer was I don't know,
2 sir, I was in the betatron. He did not
3 actually witness this, he simply repeated what
4 he had been told, what he had recently in a
5 telephone conversation had gotten from another
6 former employee.

7 And for the record, it would be Dr.
8 Ziemer, asked about what was the actual
9 distance, he suggested another worker who was
10 in -- they made a distinction from what I
11 gather. They had the isotope workers and they
12 had the betatron operators. Now betatron is a
13 very sophisticated machine, very obviously,
14 and you need to be trained to operate it.
15 However, it was not regulated by the AEC but
16 the isotopes were. Consequently, the isotope
17 operators had to be qualified. The AEC did
18 not actually certify each operator. They
19 didn't get a license from the AEC but
20 nevertheless, GSI had to submit to the AEC
21 here are the people on the earlier license and

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1 they actually named them. Later on they
2 stopped naming them. Here are the people we
3 propose as isotope operators and here is the
4 training and they passed the course. And the
5 AEC would come back and say no, this is
6 inadequate. Did they ever pass the training
7 yet. So we had to wait until the training.
8 There was all those points. So there was a
9 formality.

10 So the gentleman who reported it
11 was not an isotope operator. He was a
12 betatron operator. And he referred Dr. Ziemer
13 to an isotope operator who could give him that
14 information. And that report, Dr. Ziemer
15 wrote up the interview. And that worker who
16 also by coincidence I had talked to earlier,
17 and also his name was furnished to me, said
18 no, that was not. The small sources, the
19 small cobalt sources were never used in the
20 open. They were only used in this radiography
21 room that was specifically constructed to

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1 satisfy the AEC, to get their license. I
2 mean, they went through a very elaborate
3 thing. Inside their number six building they
4 constructed this room, it can be referred to
5 as a building, I would call it a room. It had
6 no ceiling, no roof. But it had thick walls
7 or something like 60 by 20 feet. And inside
8 was partitioned and there was four-inch thick
9 armor plate so that to shield the operator so
10 that the source was exposed by a cable but the
11 operator was never in line of sight from the
12 source because the cable would snake around
13 that partition.

14 And again, they seemed to have a
15 pretty good set up and they used those sources
16 only inside that room. They had a small
17 source. They had a 260 and 280 millicurie
18 sources. I'm not sure how they could use them
19 simultaneously but perhaps inside a heavy
20 casting one would not be exposed to the other.
21 But anyway, they used them there.

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1 And the big source, which came
2 later. The same person that we both talked
3 to, I asked him specifically when did you get
4 the 80-curie source. That was before we had
5 the AEC records and actually my motive was to
6 say well cobalt decays. I wondered how old it
7 was. He said he did not know. He had no
8 recollection of when the source was there.

9 He was there according to his film
10 badge records, he was there until the very
11 end. He came at the same time that the others
12 came. Apparently they had a hiring program in
13 '63. Probably when the Eddystone foundry shut
14 down.

15 CHAIRMAN ZIEMER: Bob are you still
16 on the radium here? You are moving into
17 cobalt.

18 DR. ANIGSTEIN: Well the reason I
19 am going into this is to clarify the practices
20 in the radium period. And he said with the
21 80-curie source, they did it only inside the

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1 betatron building. And with the new betatron
2 building, which was designed and built by GSI,
3 it was not nearly as protected as the old
4 betatron building because it had one area that
5 was just not shielded and it connected right
6 to the 10 Building so that you could get
7 radiation going right into the 10 Building.

8 So that is where they set up that
9 perimeter. They knew that outside the 10-foot
10 thick walls they probably didn't even bother
11 checking because there was no problem. But
12 they found an area where workers could be
13 exposed and that was the area they roped off.

14 And even not knowing that, I had
15 done a study in my 2008 paper which calculated
16 dose rates in the occupied areas. And those
17 areas were shut off. So that was where they
18 set up the perimeter. They did not put a
19 source in the middle of a room and draw a
20 circle around it and shut it off. They didn't
21 do it for the cobalt and there is no reason to

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1 believe they would have done it for the
2 radium.

3 So therefore, it is our opinion,
4 and ours because I confirmed this with John,
5 that given the lack of knowledge of the radium
6 era, the only thing we know is they had 500
7 millicurie sources. We know that what the
8 exposure that related back, we don't know what
9 the exposures were but they assumed they would
10 be the same as with the small cobalt sources.

11 Okay, it is a plausible assumption
12 and it's as good as any because, you know, and
13 we can't have anything contrary. But at the
14 actual radiation safety program, where were
15 the workers? Where were they situated? What
16 was the monitoring? Certainly what was the
17 monitoring of the workers not performing
18 radiography? It is a black hole. We have no
19 information.

20 There is no reason to believe that
21 there were film badges then. They may have

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1 had pocket dosimeters. There may be a reason
2 for that record but there is just not enough
3 information, in our opinion, to assign
4 workers, to assign doses.

5 And I hesitate to say this but it
6 is not our judgment but with sufficient
7 accuracy for the purposes of dose
8 reconstruction we cannot assume. I mean, the
9 factors that are assumed in Dave's paper for
10 the cobalt sources is based on a
11 misinterpretation. That was not the fact.
12 The cobalt sources were in that radiography
13 room and the doses from those cobalt, to the
14 small cobalt sources were based on the
15 radiation survey done by [Identifying
16 Information Redacted] and I can't disagree
17 with that.

18 And however that, they say it was a
19 practice of this roping off one and a half
20 times the distance. As far as I can tell,
21 that did not happen during the cobalt.

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1 Certainly there is no reason to believe it
2 would have happened during the radium. Thank
3 you.

4 CHAIRMAN ZIEMER: One comment I
5 want to make at this point. I think the
6 petitioner suggested or the co-petitioner Dr.
7 McKeel suggested that there is some reason to
8 think that there were film badges during that
9 period, at least based on that early
10 photograph. I mean, we don't have evidence.
11 We don't have any records.

12 But did I understand you correctly,
13 Dan, on that that you believe there is reason
14 to think that there might have been film badge
15 records in that radium era?

16 DR. McKEEL: Yes. That one
17 photograph I can resend again to everybody.
18 But I mean, it is quite clear that he was
19 wearing a film badge in 1953.

20 DR. ANIGSTEIN: No question.

21 DR. McKEEL: Paul, the other

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1 comment I really would like to assert at this
2 moment because there have been allusions to
3 the SEC and this discussion. And I just need
4 to put on the record that before this meeting
5 with the announcement that the new exposure
6 models would be with the schedule for those to
7 be generated, I had correspondence with Stuart
8 Hinnefeld about exactly what these relate to.
9 And the bottom line was that Stuart had said
10 to me twice that these models relate to an
11 eventual revised Appendix BB. So he said
12 quite clearly twice that NIOSH had no
13 intention of revising its SEC Evaluation
14 Report.

15 So you know, sometimes we talk
16 about what is an SEC issue and what is a dose
17 reconstruction issue. But from the head of
18 DCAS, we have to regard this whole discussion
19 as discussions for models that will lead to a
20 revised Appendix BB. And you know, that may
21 or may not relate directly to the SEC.

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1 So I just think we need to keep
2 that in order and keep that track straight.

3 CHAIRMAN ZIEMER: Well Dan, that is
4 a good point. And let me emphasize here
5 certainly from my point of view and the Work
6 Group's, one of the issues of course on an SEC
7 is whether or not dose can be reconstructed.

8 So I think that from NIOSH's point
9 of view at this point, they believe that dose
10 can be reconstructed and this is how they will
11 do it. If the Board were to find that, for
12 example, a dose in the early period cannot be
13 reconstructed with sufficient accuracy, then
14 that leads to an SEC.

15 So from our point of view,
16 consideration of the models is still an SEC
17 issue, in that we have to ascertain whether we
18 believe dose can in fact be reconstructed with
19 sufficient accuracy.

20 DR. McKEEL: Oh, I agree with that.

21 CHAIRMAN ZIEMER: Yes, so and that

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1 is the reason for discussing the models. And
2 so NIOSH has before us how they propose to
3 reconstruct dose. SC&A has suggested some
4 concerns about not only the assumptions for
5 reconstructing dose but other issues that may
6 lead one to say there may be facets of this
7 where you can't reconstruct dose with
8 sufficient accuracy for all claimants. So
9 that is what we struggle with here.

10 And so in my mind, this still is an
11 SEC issue, even though we are talking about
12 how you reconstruct dose. Because we have not
13 reached a position on this.

14 And of course the other part of it
15 is that this systematically, it is sort of
16 easier to break this into pieces. Because any
17 one of these pieces, whether it is radium or
18 betatrons, or portable X-rays, any one of
19 these pieces, if that is the piece that says I
20 can't reconstruct dose with sufficient
21 accuracy, then you have an SEC issue.

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1 DR. McKEEL: I understand that.

2 CHAIRMAN ZIEMER: Yes. So we do
3 from our point of view, I think this at the
4 present time is not an Appendix BB. Yes, if
5 they end up -- if things end up and we say
6 okay, we can reconstruct everything but we
7 have new information on doing it better or you
8 know, then they obviously would change the
9 Appendix BB to reflect that, just as the issue
10 which we have already put to bed but hasn't
11 shown up yet of the extended workweek has
12 already been resolved and NIOSH has agreed
13 that that is an issue that would show up in a
14 revised appendix and which could affect dose
15 reconstruction.

16 So we have to deal with all of
17 these but I do appreciate the reminder that we
18 need to keep those in mind if there are
19 several parts to this. There is the Appendix
20 BB issue. There is the SEC issue.

21 DR. McKEEL: But then I would

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1 comment about the radium issue. If I could
2 just make a couple more comments.

3 CHAIRMAN ZIEMER: Yes, you
4 certainly may.

5 DR. McKEEL: I personally agree
6 with the SC&A position that there is way too
7 much unknown about what happened in that
8 Building 6. And I would also point out that
9 there is discrepancy on several fronts.

10 CHAIRMAN ZIEMER: Let me interrupt
11 a minute. I don't think the Building 6 issue
12 comes into the radium, does it? They didn't
13 build that until --

14 DR. ANIGSTEIN: That's correct.

15 CHAIRMAN ZIEMER: -- the cobalt
16 era.

17 DR. ANIGSTEIN: Right.

18 CHAIRMAN ZIEMER: Right?

19 DR. ANIGSTEIN: There was a
20 building --

21 CHAIRMAN ZIEMER: Is that your

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1 understanding, too, Dan? I mean Building 6
2 was there but the special part was --

3 DR. ANIGSTEIN: Radiography room.

4 CHAIRMAN ZIEMER: -- prepared for
5 the cobalt sources.

6 DR. ANIGSTEIN: Correct.

7 CHAIRMAN ZIEMER: Is that not
8 correct?

9 DR. ANIGSTEIN: Right. The
10 radiography room was built inside of Building
11 6.

12 CHAIRMAN ZIEMER: Yes, but that
13 wasn't there for the radium era.

14 DR. ANIGSTEIN: That was built in
15 1962 --

16 CHAIRMAN ZIEMER: Right.

17 DR. ANIGSTEIN: -- to get the
18 radium license.

19 DR. MAURO: And could I --

20 DR. McKEEL: But then I would say
21 and you all don't really know -- maybe John

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1 Ramspott could weigh in on this. It was my
2 understanding that radium sources were used
3 primarily to X-ray things like railroad trucks
4 and so forth.

5 I mean, then what is also missing
6 from this narrative of facts is where was the
7 radium sources actually used?

8 MR. RAMSPOTT: Dr. McKeel, this is
9 John Ramspott.

10 DR. McKEEL: Yes.

11 MR. RAMSPOTT: May I add something
12 here?

13 DR. McKEEL: Please.

14 MR. RAMSPOTT: Dr. Anigstein
15 definitely referred to the lawsuit at
16 Eddystone and we know there was an incident
17 which I know have two workers that will
18 confirm the theft of a plumb bob. And from
19 everybody's research, it looks like the plumb
20 bob is radium -- contains radium. Everything
21 I have read from the ORAU website and what

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1 have you.

2 And those plumb bobs weren't stolen
3 out of a betatron or a testing building. They
4 were stolen from a worksite out on a plant.
5 The one at GSI was taken during a test in 10
6 Building. Jerry Dutko and I actually had
7 breakfast with the supervisor who had to
8 report to his boss that it was taken by a
9 worker or welder. So that was definitely in
10 10 Building.

11 DR. McKEEL: Where were the radium
12 sources for these 10 shots per day and the one
13 long shot, where were they routinely done?
14 That is my question. But I don't think
15 anybody knows the answer to that.

16 MR. RAMSPOTT: My expert or I would
17 think sound advice is anywhere it needed to
18 be. I just sent an email --

19 DR. McKEEL: Do you know that as a
20 fact or are you just --

21 MR. RAMSPOTT: Yes, I actually have

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1 that in a statement from the gentleman who had
2 to acknowledge the theft to his boss. I have
3 an email which I can send to everyone from him
4 that actually said they used it wherever they
5 had to.

6 CHAIRMAN ZIEMER: Let me ask you a
7 question here. Maybe --

8 DR. McKEEL: I just have to follow-
9 up on that and say that introduces a huge
10 amount of uncertainty, then.

11 CHAIRMAN ZIEMER: Well that is the
12 point I want to make here. I think we want to
13 ask NIOSH what their assumption was. I
14 believe that they have assumed that in essence
15 you might do this sort of anywhere but you
16 would have it marked off at the one and a half
17 times the 2 mR per hour level wherever it was
18 done. But there would be a possibility of
19 people wandering through there.

20 Dave, could you clarify what your
21 assumption is on where the sources were used?

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1 MR. ALLEN: That was exactly the
2 assumption is we didn't try to determine
3 exactly where they were used because, as Dr.
4 McKeel said, there is a high degree of
5 uncertainty there. So we tried to come up
6 with a bounding estimate. And that is,
7 essentially, people were near where it was
8 used, wherever that is.

9 CHAIRMAN ZIEMER: Right. So their
10 model would say you could use that anywhere in
11 the plant and the assumption here is that
12 there were some standard practices and that
13 this was the one and a half times the 2 mR per
14 hour distance that would be invoked and that
15 is where, Bob, I think on your chart that is
16 where some of those numbers came from.

17 For the radium sources, you can,
18 knowing the activity, you can calculate that
19 distance.

20 DR. ANIGSTEIN: Well actually we
21 both did that. Dave did that and I did that

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1 separately for the St. Louis Testing sources.
2 But actually it is not correct because they
3 are inside the casting. So that would be a
4 bare source.

5 CHAIRMAN ZIEMER: Right. But that
6 would bound it.

7 DR. ANIGSTEIN: Oh, absolutely.

8 CHAIRMAN ZIEMER: In other words,
9 if you said it was a bare source and went out
10 the proper distance, that would bound the
11 exposure. Because if it is inside of a
12 casting, it has got to be less than that.

13 DR. ANIGSTEIN: Presumably, when
14 they did the survey, they did the survey after
15 they put it in the casting or before. But I
16 still --

17 CHAIRMAN ZIEMER: But you are not
18 giving credit to the casting, Dave, are you?
19 You are just taking the source strength.
20 Right?

21 MR. ALLEN: Right. But that

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1 doesn't make a lot of difference what the
2 boundary, where the boundary would be. So it
3 is the dose rate at the boundary. It makes a
4 big difference in how much area you had to cut
5 through and that really increases that
6 estimate.

7 DR. MAURO: Could I say something?

8 CHAIRMAN ZIEMER: Yes, John.

9 DR. MAURO: I think we are at the
10 essence of the SEC issue, as it applies to the
11 radium era. That is where the weight of
12 evidence comes in. I think David's set of
13 assumptions, a certainly plausible set of
14 assumptions, if you accept that there were
15 adequate controls in place where boundaries
16 could be set up and enforced for the duration
17 of the time the exposures were ongoing.
18 Notwithstanding where it was used, if those
19 controls were in place, certainly Dave's
20 assumptions or perhaps Bob's assumptions could
21 be used as a way to bound the problem.

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1 The real question becomes and I
2 think the information Dr. McKeel provided is
3 important also because if there was a health
4 physics oversight program which included film
5 badges, that would go toward the weight and I
6 would say yes, in fact such controls were in
7 place. There was obviously someone overseeing
8 a film badge program. And along with that,
9 one could presume there was a certain degree
10 of oversight.

11 If you feel that such a program was
12 not in place, there was no regulatory
13 authority such as the state as Bob Anigstein
14 just indicated was about in the late 1950s
15 when perhaps that program started to take
16 hold, then it becomes the weight starts to
17 shift toward well maybe there wasn't as much
18 control over the way in which this practice
19 was performed in the '50s as we would have
20 liked.

21 And this is where I come out after

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1 working with Bob, reading it, it becomes a
2 matter of if you feel that the controls were
3 there, then the types of modeling and
4 assumptions that David did and that Bob did,
5 certainly are a way to place an upper bound on
6 the workers and any exposure they might have
7 experienced.

8 If you feel that such controls were
9 questionable for whatever reason, such as the
10 example of the lost source that sort of
11 indicates the other way, that maybe there
12 wasn't the controls you like and whether or
13 not that was a one-time occasion or could have
14 happened more often.

15 And I think that we are at that
16 place where we collected the facts. Certainly
17 some facts are in question but in the end it
18 really becomes a matter of do you trust that
19 the controls are in place so that we can place
20 a plausible upper bound that we can apply to
21 all workers at that time.

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1 And right now as Bob had indicated,
2 we do have some serious concerns regarding
3 whether those controls were there. And I
4 think that is where we sort of hand the ball
5 off to the Work Group.

6 CHAIRMAN ZIEMER: Yes. Well, John,
7 I think that is a good point. And I think we
8 have to concede that there was not regulatory
9 control. And this was true everywhere in the
10 country in the early '50s on radium. Radium
11 was not regulated. You didn't need any kind
12 of a license to get it, and I don't think
13 there were any states -- see many states in
14 the late '50s began registering sources and
15 they participated in inspections usually with
16 the AEC. But in the early '50s, I don't
17 believe anybody regulated radium. And the
18 only thing we had were standards, or I
19 wouldn't even call them standards. We had
20 NCRP or its forerunner, which was what we now
21 call NCRP had recommendations on the safe use

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1 of radium and some of those early
2 recommendations have the word radium; not
3 radiation safety but radium safety. And those
4 were guidelines.

5 So I think we have to concede there
6 was not regulatory control. So any control
7 had to be built into the organization that was
8 using it. And it was as weak or strong as
9 their administration would make it.

10 So that point, I think, is well
11 taken. We do have some worker testimony that
12 suggests that there was this boundary issue
13 but then we have things like the source
14 disappearing.

15 DR. ANIGSTEIN: I still do not
16 believe they ever set up these boundaries.
17 St. Louis Testing set up the boundaries, no
18 question about that. And the boundaries were
19 set up outside at those unshielded areas of
20 the betatron building with the 80-curie
21 source.

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1 But there is no information, there
2 was thus a misinterpretation that the cobalt
3 sources were used in an open room area --

4 CHAIRMAN ZIEMER: But we are
5 talking about the radium sources.

6 DR. ANIGSTEIN: I know but what I
7 mean the only reason they assumed that for the
8 radium source was -- well, they did it for the
9 cobalt so they probably did it for the radium.
10 They didn't do it for the cobalt. And there
11 is no reason to believe they did it for the
12 radium.

13 CHAIRMAN ZIEMER: Well, I --

14 DR. ANIGSTEIN: And if they did,
15 why wouldn't they --

16 CHAIRMAN ZIEMER: I'm thinking
17 maybe it was the reverse of that, that they
18 did it for the radium and we assumed that they
19 might have done it for the cobalt.

20 DR. ANIGSTEIN: But there is no
21 information that they did it for the radium.

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1 There was no testimony. The testimony was
2 from the one worker, the betatron operator who
3 wasn't there employed during the radium era,
4 who was also not an isotope user, who talked
5 to an isotope man recently. And he gave some
6 information but then when he was asked give me
7 details, he said talk to another man, who said
8 we did not use the cobalt sources in the open.

9 CHAIRMAN ZIEMER: Right. However,
10 the early application where the individual
11 gave his biographical training and he cited
12 the practices that he was trained under. I
13 believe it went back into the '40s.

14 DR. ANIGSTEIN: No, that was
15 outside of GSI.

16 CHAIRMAN ZIEMER: It was outside of
17 GSI, but it was a person who was brought in to
18 help with the licensing process. Right?

19 DR. ANIGSTEIN: Yes, but he wasn't
20 there during the radium. But the licensing
21 process didn't start until '62.

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1 CHAIRMAN ZIEMER: I know, but I am
2 saying that the training that he brought to
3 them --

4 DR. ANIGSTEIN: Well, there is no
5 question once they started the licensing they
6 had a good program.

7 CHAIRMAN ZIEMER: Right. But he at
8 least talked about I think the 2 mR per hour
9 practice that was used.

10 MR. ALLEN: You're talking -- I'm
11 sorry. But you are talking about the
12 biographical sketch for one of the
13 radiographers at GSI, not the --

14 CHAIRMAN ZIEMER: Well, I'm trying
15 to remember which one it was. I would have to
16 go back to my notes, but I was thinking it was
17 the person that helped them with the license.
18 And he talked about -- the person whose
19 biographical material went back into the '40s
20 and he talked about all the early training
21 that he had. And it was clearly with radium

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1 sources at that time, way prior to the cobalt
2 era.

3 MR. ALLEN: There were several
4 people who had biographical sketches in the
5 license. One was their consultant.

6 CHAIRMAN ZIEMER: Right.

7 MR. ALLEN: I don't remember for
8 sure if he actually had a biographical sketch
9 in there but they had to put essentially their
10 training and qualifications of various people
11 that were going to be using isotopes.

12 CHAIRMAN ZIEMER: Right.

13 MR. ALLEN: And there were several
14 biographical sketches there, including what
15 their training was, et cetera.

16 CHAIRMAN ZIEMER: Right. Well, in
17 any event, you are right. We don't know
18 specifically what the practice was, you know,
19 whether that one and a half distance --

20 DR. ANIGSTEIN: There is no basis
21 for that. I'm sorry. It is one worker's

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1 second-hand testimony about a different
2 practice in a different location which
3 referred to the 80-curie source.

4 CHAIRMAN ZIEMER: Yes.

5 DR. ANIGSTEIN: There is no basis
6 for that assumption that there was a source
7 put in the middle of a room and they walked
8 around with a survey meter and surveyed the
9 area and then paced off a bigger distance.
10 There is just no basis for it.

11 CHAIRMAN ZIEMER: Well, in any
12 event, if they were doing radiography based on
13 the training of those earlier radiographers --

14 DR. ANIGSTEIN: Well, the training,
15 again, that person came later. He was brought
16 in during the early radiography. We know the
17 one worker they referred [Identifying
18 Information Redacted] who I interviewed, we
19 know he was there. And there was some
20 discussion about that they had an informal,
21 they did not have a formal training program.

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1 They had an informal training program. And if
2 they had practiced something like that, I
3 would have thought they would have proudly
4 called the AEC. Look how good we are over
5 here, we have developed this careful --

6 CHAIRMAN ZIEMER: Well --

7 DR. NETON: They did say in their
8 original application that no one had exceeded
9 the limit and that its workers averaged less
10 than 25 percent of the limit.

11 DR. ANIGSTEIN: Yes, they did.

12 DR. NETON: So they clearly had
13 some knowledge of the exposures these people
14 were --

15 DR. ANIGSTEIN: They said that but
16 no one ever checked their records. The only -
17 - there was an inspection by the AEC of the --
18 they came in, they inspected that thing,
19 effected a plan, looked at their records. But
20 they only looked at the exposure records since
21 the beginning of the AEC license and the

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1 highest exposure was 55 millirems.

2 CHAIRMAN ZIEMER: Okay, so there is
3 an uncertainty factor here on this. You know,
4 grant that we may come down in different
5 places as to what we think they did before
6 that.

7 There is one other thing and I
8 think Dan McKeel suggested it and I just want
9 to raise this. And that is, has there been or
10 can there be any effort to get the records of
11 St. Louis Testing, number one, the license
12 information? And number two, has Mallinckrodt
13 been approached to get possible film badge
14 records of the other group?

15 DR. NETON: Well, to answer the
16 second one, we obviously in the past --

17 CHAIRMAN ZIEMER: I know you have
18 gone through a lot of Mallinckrodt's stuff.

19 DR. NETON: -- I just looked. We
20 have 1700 files of Mallinckrodt records that
21 is on our research database. In preparation

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1 of this meeting, I went through not all the
2 files, but I did extensive keyword searches
3 trying to identify documents that maybe we had
4 missed this little cache of records, of the
5 Mallinckrodt cache we have, repository. And I
6 found nothing in there that suggested there
7 were these records related to GSI monitoring.

8 CHAIRMAN ZIEMER: Are there any
9 records relating to the sort of the purchase
10 of this other company by Mallinckrodt?

11 DR. NETON: Well, see, I didn't
12 look in that -- I was looking for exposure
13 records, you know, to see if there was any
14 evidence that maybe embedded in some of the
15 Mallinckrodt routine exposure reports there
16 would have been --

17 CHAIRMAN ZIEMER: No, I was
18 wondering about the name of the other, Nuclear
19 --

20 DR. ANIGSTEIN: Nuclear Consulting
21 Corporation. What I found on that was the

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1 only thing that Mallinckrodt purchased was
2 their nuclear medicine business because they
3 were supplying isotopes for nuclear medicine,
4 which then Mallinckrodt went into big time,
5 they were a big --

6 CHAIRMAN ZIEMER: So they didn't
7 buy the whole company?

8 DR. ANIGSTEIN: The only thing that
9 was any mention that I could find on the web
10 was the acquiring the nuclear medicine part of
11 it. I tend to doubt they would have bothered
12 getting into the film badge business.

13 MEMBER POSTON: Paul?

14 CHAIRMAN ZIEMER: Yes.

15 MEMBER POSTON: This is John
16 Poston.

17 CHAIRMAN ZIEMER: Hi, John.
18 Welcome.

19 MEMBER POSTON: I was waiting for
20 an opportune time and there was no such thing.
21 So I just wanted --

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1 CHAIRMAN ZIEMER: You are actually
2 here earlier than we thought you would be,
3 John.

4 MEMBER POSTON: Well, I have been
5 listening since about 9:15 but I just --

6 CHAIRMAN ZIEMER: Oh, good.

7 MEMBER POSTON: -- couldn't get a
8 word in edgewise to let you know I am here.

9 CHAIRMAN ZIEMER: Okay, good.
10 Thanks, John.

11 Did you get all the documents that
12 we have been referring to?

13 MEMBER POSTON: Yes, I did.

14 CHAIRMAN ZIEMER: Okay, thank you.

15 So we don't think there is anything
16 at Mallinckrodt that would enlighten us on
17 that issue of are there some other film badge
18 records.

19 DR. McKEEL: Dr. Ziemer, this is
20 Dan McKeel. May I please make a comment?

21 CHAIRMAN ZIEMER: Of course.

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1 DR. McKEEL: My comment is that
2 what I just heard was that NIOSH had searched
3 its own database to see if there were film
4 badge information from Mallinckrodt. That is
5 not the same as asking and seeking those
6 records through the Department of Energy,
7 through Oak Ridge Operations which has a lot
8 of those records, and Amy Rothrock, their FOIA
9 officer and other knowledgeable people at the
10 Department of Energy. I don't think that is
11 the same thing at all.

12 And if, you know, not to be
13 critical, but I just want everybody to
14 remember that you would have no GSI film
15 badges at all from the Landauer program, had I
16 not contacted Landauer a year before NIOSH got
17 their data set. And you all would not have
18 any of those 1,016 pages of NRC FOIA material
19 had I not gotten the license material from the
20 NRC.

21 So you know, if you looked at the

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1 NIOSH database prior to my getting those
2 records for you, you would find a similar
3 situation; no records. No film badge records
4 and no source term licensing records.

5 So I don't think that argument,
6 that is not what I am talking about at all.
7 I'm talking about sending a very directed,
8 targeted request through your channels, or
9 FOIA, or however you get information from the
10 Department of Energy.

11 There is a NIOSH DOE Memorandum of
12 Understanding where they routinely exchange
13 information. I'm saying that NIOSH should ask
14 Department of Energy to look a lot harder.

15 I also bring up in that context,
16 you know, we did that as well for the Dow
17 Madison Company and found information there
18 that the thorium alloys were used in nuclear
19 weapons.

20 So, again, the fact that records
21 aren't found now does not mean, and you all

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1 have said this in your meetings many times,
2 that does not mean those records do not exist
3 now. It just means they haven't been located.

4 So I mean I think that your
5 suggestions are really very good that the St.
6 Louis Testing license should be sought not
7 just from St. Louis Testing but from the NRC,
8 the way I got the licenses for GSI. And then
9 I think a formal request should be made to
10 look as hard as possible through NARA through
11 Oak Ridge -- well, through Department of
12 Energy, all of their resources. They would
13 have those records. You could also get in
14 touch with Tyco, who is the current owner of
15 Mallinckrodt and directly converse with them.
16 Who knows what they have in their basement? I
17 don't, but it could be looked into.

18 So that is really the basis for my
19 suggestion.

20 CHAIRMAN ZIEMER: Thanks, Dan.
21 That certainly makes sense to me. I want to

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1 ask Jim or Dave, is that something that is
2 feasible to follow-up on by NIOSH? Is it -- I
3 mean --

4 MR. ALLEN: Well, as far as the St.
5 Louis Testing license through NRC, I don't
6 think we ever did ask for that. And that is
7 something we can definitely go back and do.

8 CHAIRMAN ZIEMER: Let's definitely
9 do that. Is there -- what about the other?
10 Jim, do you have a reaction to that?

11 DR. NETON: Well, we could attempt
12 that. I mean --

13 CHAIRMAN ZIEMER: We don't know.

14 DR. NETON: I never say never.

15 CHAIRMAN ZIEMER: Okay.

16 DR. NETON: Like I say, we captured
17 a lot of records from Mallinckrodt. We
18 weren't specific about what we were looking
19 for there. We cast a very wide net, but it is
20 possible that --

21 CHAIRMAN ZIEMER: That maybe with

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1 some specificity on Nuclear Consultants and so
2 on, maybe something would show up.

3 DR. NETON: We could try that.

4 CHAIRMAN ZIEMER: Have we obtained
5 from NRC anything on Nuclear Consultant's
6 license?

7 DR. McKEEL: I have not sent a
8 formal FOIA request.

9 CHAIRMAN ZIEMER: I'm wondering if
10 we couldn't request that. Maybe their license
11 would shed some light on this as well.

12 DR. McKEEL: Yes. Their license is

13 --

14 CHAIRMAN ZIEMER: It seems to me
15 before we sort of reach a decision on the
16 radium part that those two pieces of
17 information would be very helpful.

18 MEMBER BEACH: So is this for the
19 '53 to '64 or the '62 --

20 CHAIRMAN ZIEMER: No, this is the -

21 -

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1 MEMBER BEACH: Very early.

2 CHAIRMAN ZIEMER: This is this
3 early era. It is really before the cobalt
4 era.

5 DR. ANIGSTEIN: And what is the
6 relevance?

7 MR. RAMSPOTT: Dr. Ziemer?

8 CHAIRMAN ZIEMER: Yes. I think the
9 relevance is that if there --

10 DR. ANIGSTEIN: I mean, the NC,
11 Nuclear Consulting Corporation only came in
12 when they applied for the NRC -- for the AEC
13 license in '62. So they had no function
14 before that.

15 They were not involved in the
16 training program. That is very clear. The
17 training program was started only when they
18 applied for the license.

19 I don't see where it would cast any
20 light on that era. And certainly, St. Louis
21 Testing is still in existence.

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1 CHAIRMAN ZIEMER: There was some
2 suggestion that they had some film badge
3 records.

4 DR. ANIGSTEIN: Yes, but not from
5 the earlier time.

6 CHAIRMAN ZIEMER: Well, certainly
7 '62 to '64.

8 DR. ANIGSTEIN: No, no. They
9 definitely had film badge records. My guess
10 is from about May '62 or some month in '62
11 until November '63 there is no question that
12 NCC had the film badge records because we have
13 this one worker's report.

14 So there was an 18-month period
15 when they were involved. And then apparently
16 GSI discontinued their relationship and they
17 brought in St. Louis Testing not only to do
18 radiography, that was later, but also to be
19 their consultant, their nuclear safety
20 consultant. And [Identifying Information
21 Redacted] was there. He said he was called in

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1 once when there was a problem with a cobalt
2 source.

3 CHAIRMAN ZIEMER: Are you saying we
4 know that they didn't provide film badge
5 service prior to that?

6 DR. ANIGSTEIN: You can never prove
7 a negative. I can't say they didn't.

8 CHAIRMAN ZIEMER: Well, one could
9 ask the question why did they bring them in.
10 You see?

11 DR. ANIGSTEIN: They brought them
12 in to satisfy the NRC -- the AEC.

13 CHAIRMAN ZIEMER: Oh, yes. I
14 understand that. But I mean why select them?
15 Maybe there was a prior relationship. Do we
16 know that they weren't --

17 DR. ANIGSTEIN: Oh they
18 specifically said why they selected them.
19 They were the only AEC-qualified in the St.
20 Louis area. They were the only ones who were
21 qualified. They explained that. They sought

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1 them out because they were the only ones
2 available.

3 MR. RAMSPOTT: Dr. Ziemer?

4 CHAIRMAN ZIEMER: Yes.

5 MR. RAMSPOTT: John Ramspott.

6 CHAIRMAN ZIEMER: Yes, John?

7 MR. RAMSPOTT: I can maybe save you
8 a lot of looking for naught. I'm looking at
9 an email from Mr. Sinn of St. Louis Testing.

10 CHAIRMAN ZIEMER: Right.

11 MR. RAMSPOTT: And they started
12 doing work at General Steel about the same
13 time they were involved with the building of
14 the St. Louis Arch -- 1964. I have that email
15 in front of me.

16 DR. ANIGSTEIN: Okay. And that is
17 consistent.

18 MR. RAMSPOTT: Yes, Bob. I heard
19 you speaking, and that is correct. You were
20 right.

21 CHAIRMAN ZIEMER: Okay. So you

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1 don't think the early film badges then came
2 from them. They had to come from another
3 source.

4 DR. ANIGSTEIN: If there were any
5 early film badges. In my opinion, they may
6 have used pocket dosimeters, but there is no
7 reason to believe they used film badges
8 because [Identifying Information Redacted]'s
9 report says film badge in 1963, they give
10 quarterly readings based on film badges.
11 Those were film badges, undoubtedly, from NCC,
12 later in mid-November replaced by Landauer.

13 The earlier ones simply say record.
14 They don't say FB. There are two pages.

15 CHAIRMAN ZIEMER: I understand.

16 DR. ANIGSTEIN: One says FB. The
17 other one says record.

18 CHAIRMAN ZIEMER: Again, Dr. McKeel
19 is suggesting there were film badges way back
20 --

21 DR. McKEEL: No, no. I read into

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1 the record that there is a film badge report
2 with monthly readings from 1962. And it says
3 in a checked box that they were film badge
4 readings, F dot B dot. So there is no
5 question that [Identifying Information
6 Redacted] had film badge readings each month
7 with the millirem gamma listed on a report
8 that we have and that I can send to you.

9 So definitely he was getting film
10 badge data in 1962 from January through
11 December. That is unequivocal.

12 DR. ANIGSTEIN: Well, Dr. McKeel,
13 then you never furnished that to us. The only
14 thing you furnished us were two pages. And
15 the first page was issued, the record was
16 written by NCC --

17 DR. McKEEL: Okay.

18 DR. ANIGSTEIN: -- and it was dated
19 March '62. And it was his prior record based
20 on the word record.

21 Then there was a second page --

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1 DR. McKEEL: Dr. Anigstein, let me

2 --

3 DR. ANIGSTEIN: -- which had
4 quarterly readings in '63. We never saw
5 monthly readings on [Identifying Information
6 Redacted] So if you have those, they would be
7 useful.

8 DR. McKEEL: Well, let me respond,
9 please.

10 John Ramspott interviewed Mr.
11 [Identifying Information Redacted] and got
12 those records from him. The particular one I
13 am talking about this past weekend.

14 Now the earlier reports from him,
15 he brought to one of our meetings because that
16 was a topic of conversation. And that was
17 back in the 2006 era.

18 So when we gave those reports to
19 you, you know, and noted that there was an NCC
20 connection, that is all recorded in those 2006
21 worker outreach transcripts.

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1 This report that I am talking
2 about, let's not argue about why it wasn't
3 given to you. I think it was not given to you
4 probably because I am not aware that I have
5 seen that report before. But I can certainly
6 scan it and send it to everybody and then you
7 will have it, too. But please take my word
8 that is what it says. Monthly film badge
9 readings 1962, January through December. And
10 I will send that at our lunch break.

11 DR. MAURO: This is John. I guess
12 you are talking 1962 but I keep focusing on
13 1953. I mean, I can't get away from that.
14 And what I am hearing is that you have got
15 this photograph of someone who works there who
16 is wearing a film badge. Now this is what --
17 the showstopper.

18 DR. ANIGSTEIN: With a date.

19 DR. MAURO: Yes.

20 DR. ANIGSTEIN: It is a dated
21 photograph.

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1 DR. MAURO: Well, I am assuming
2 that the -- as represented.

3 MR. KATZ: It's in a magazine from
4 '53.

5 MR. RAMSPOTT: I actually have the
6 magazine. This is John Ramspott.

7 DR. MAURO: Now the implications
8 are if there in fact was a film badge program,
9 one, if we actually could find those records,
10 we could start reconstructing doses. The
11 other implication is if we can't find the
12 records, it's a piece of evidence that there
13 was some type of radiation protection program
14 --

15 DR. NETON: Well, and it's the only
16 way that they could have made the statement to
17 the AEC that no one exceeded 25 percent of the
18 limits, unless they pulled it out of thin air
19 and made it up.

20 DR. MAURO: So you can see why I
21 believe that this point that Dr. McKeel makes

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1 is very important. You have got this
2 photograph but it goes toward the ability of
3 reconstructing doses in those very early
4 years.

5 CHAIRMAN ZIEMER: Okay, we are
6 going to take a comfort break here. Let's
7 take a 15-minute break and reconvene at 11:05.

8 (Whereupon, the above-entitled
9 matter went off the record at 10:50 a.m. and
10 resumed at 11:07 a.m.)

11 MR. KATZ: We're back online.

12 CHAIRMAN ZIEMER: Okay, we're sort
13 of winding up on the radium issues here. And
14 NIOSH is going to or has agreed to go back and
15 see what they can learn about St. Louis
16 Testing licenses, NRC licenses. We are not
17 sure on Nuclear Consultants. Apparently we
18 know that the film badges from about maybe '62
19 to '64 were certainly Nuclear Consultants.

20 DR. ANIGSTEIN: Most likely from
21 the time they started using the cobalt sources

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1 in May of '62 until November of '63 when
2 Landauer started.

3 CHAIRMAN ZIEMER: When Landauer
4 took over. And there may have been some film
5 badges prior to that, based on that 18
6 quarters that were mentioned because that
7 takes us back before '62, I think, maybe to
8 '58 or so. Do we know that those were also
9 Nuclear Consultants?

10 DR. ANIGSTEIN: It says record. It
11 doesn't say film badge.

12 CHAIRMAN ZIEMER: Yes. Well,
13 whatever --

14 DR. ANIGSTEIN: There is a
15 distinction. No, but there is an interesting
16 distinction. When they gathered from film
17 badges it says F.B.

18 CHAIRMAN ZIEMER: Right. I
19 understand that.

20 DR. ANIGSTEIN: In the earlier one
21 it says records.

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1 CHAIRMAN ZIEMER: I understand
2 that.

3 DR. ANIGSTEIN: Why wouldn't they
4 F.B. if they were in fact?

5 CHAIRMAN ZIEMER: I don't know. I
6 don't know.

7 In any event, let's double check.
8 Dr. Poston, are you back on the line?

9 Dr. McKeel? Are we not online?

10 MR. KATZ: John?

11 MR. RAMSPOTT: Ramspott.

12 MR. KATZ: Yes, that's John
13 Ramspott.

14 John Poston, are you with us again?

15 DR. NETON: Is he on mute?

16 CHAIRMAN ZIEMER: Is Dr. McKeel
17 back on as well?

18 MEMBER POSTON: I actually had to
19 redial in. So I don't know if I got
20 disconnected. Maybe they did, too.

21 MR. KATZ: Maybe. The lines, we

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1 haven't re-dialed in so the line has been
2 running this whole time.

3 MR. RAMSPOTT: That's what I
4 thought. But it seemed like it was getting
5 pretty long so I hung up and re-dialed in and
6 heard you talking.

7 MR. KATZ: Yes, I mean it was on
8 mute. So wouldn't have heard us on the line.

9 CHAIRMAN ZIEMER: Well, we are just
10 starting in again. We indicated that NIOSH
11 has agreed to check to see if they can find
12 records relating to the St. Louis Testing
13 license on --

14 MR. RAMSPOTT: Are you talking
15 about the license for the iridium, Paul?

16 CHAIRMAN ZIEMER: Iridium, right.
17 Iridium and cobalt, I think they had both.
18 And we are trying to pin that down exactly.

19 MR. RAMSPOTT: Because the reason,
20 I was looking for something for you before on
21 the date of when they started working over

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1 there.

2 CHAIRMAN ZIEMER: Yes.

3 MR. RAMSPOTT: And in that email, I
4 never noticed this before, but it said the
5 area was -- let's see. "We used the cobalt-60
6 source outside the buildings on a railroad car
7 on the track. It was 180-hour shot."

8 I'm going to send that to you
9 because I didn't even know they had cobalt
10 that big over there using it outside. Because
11 I remember from 1,000 pages of information
12 that Dr. McKeel sent they were trying to get
13 permission to do some outside shooting with
14 large cobalt.

15 CHAIRMAN ZIEMER: Right.

16 MR. RAMSPOTT: It was denied. So
17 this is 1964 not --

18 CHAIRMAN ZIEMER: Right.

19 MR. RAMSPOTT: And Mr. Sinn is
20 definitely available for re-interview.

21 CHAIRMAN ZIEMER: Okay.

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1 MR. RAMSPOTT: He is the St. Louis
2 Testing contact you are going to need anyway.

3 DR. ANIGSTEIN: Can I clarify that?
4 Bob Anigstein.

5 [Identifying Information Redacted],
6 whom I spoke with, told me exactly the same
7 information and he gave that information at
8 the meeting, John, which you arranged.

9 MR. RAMSPOTT: He used cobalt
10 there.

11 DR. ANIGSTEIN: But that was St.
12 Louis Testing that used the cobalt.

13 MR. RAMSPOTT: Yes, but we still
14 have to -- if we are accounting for other
15 sources, we have to account for cobalt by St.
16 Louis Testing at GSI in '64 because it is
17 within these windows.

18 DR. ANIGSTEIN: Say again?

19 MR. RAMSPOTT: If we are talking
20 about iridium within the window, we would have
21 to account for it. It doesn't have to be GSI

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1 source.

2 DR. ANIGSTEIN: No, St. Louis

3 Testing --

4 MR. RAMSPOTT: Now we have got

5 cobalt in '64 at GSI.

6 DR. ANIGSTEIN: No. St. Louis

7 Testing brought a cobalt source -- at

8 different times they had a cobalt source and

9 an iridium source. Mostly they used a cobalt

10 source.

11 MR. RAMSPOTT: They were both at

12 GSI, though.

13 DR. ANIGSTEIN: No, they used it at

14 GSI property but it was their source. It did

15 not belong to GSI. It was used --

16 MR. RAMSPOTT: Well, it doesn't

17 matter, does it? The uranium didn't belong to

18 GSI.

19 DR. ANIGSTEIN: There is no

20 indication, no. According to [Identifying

21 Information Redacted], they owned the cobalt

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1 source. They owned the iridium source and
2 probably many others for other purposes. And
3 they were strictly under their control. I
4 asked them did they lend them to GSI. He said
5 absolutely not.

6 MR. RAMSPOTT: Yes, but they used
7 it at GSI before.

8 DR. ANIGSTEIN: They used it on GSI
9 property under their control.

10 MR. RAMSPOTT: Okay.

11 DR. ANIGSTEIN: But we account for
12 that, John. There is no disagreement here.
13 We account for that in the model.

14 MR. RAMSPOTT: -- workers be harmed
15 by anybody's source?

16 DR. ANIGSTEIN: Pardon?

17 MR. RAMSPOTT: Wouldn't the workers
18 have been harmed by anybody's source?

19 CHAIRMAN ZIEMER: Well, they are
20 still assigning the dose to the GSI workers.

21 MR. RAMSPOTT: Are they assigning

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1 the cobalt source though?

2 DR. ANIGSTEIN: The iridium source
3 would be exactly the same because in each case
4 they marked off a boundary of 2 mR per hour.
5 And the radiographer, the St. Louis Testing
6 radiographer was there watching to make sure
7 nobody came in. And in the, I don't know if
8 you had a chance to read my report, the latest
9 one, where I postulate that sometimes he goes
10 off duty and somebody walks across that and he
11 gets an additional dose.

12 So there is no controversy here,
13 John. We are in agreement on this.

14 MR. RAMSPOTT: I'm glad you brought
15 that topic up, though, because, Paul, I
16 believe you interviewed a gentleman, Mr. Larry
17 W.

18 CHAIRMAN ZIEMER: Yes.

19 MR. RAMSPOTT: He actually told me
20 that he shut down St. Louis Testing for a
21 dangerous procedure that was going on, which

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1 was this large cobalt shot. And I just didn't
2 realize the date, apparently.

3 It gets kind of interesting. They
4 are using a large source outside. They don't
5 even have permission to do it. Somebody
6 should be --

7 CHAIRMAN ZIEMER: What dates do you
8 have for that, John?

9 MR. RAMSPOTT: I show, let's see,
10 and I will forward you this email from Mr.
11 Sinn, but it says '64, '65.

12 CHAIRMAN ZIEMER: Well, in any
13 event, and we kind of moved into the exposure
14 model for St. Louis here because --

15 MEMBER BEACH: Before we do that --

16 CHAIRMAN ZIEMER: But we'll come
17 back. But just that date is also helpful. I
18 don't know, Dave, what you assumed on the
19 usage. Maybe it is not so critical but I
20 thought you said that you were assuming most
21 of their work as pre-'62.

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1 MR. RAMSPOTT: We didn't have
2 anything until '64 though.

3 MR. ALLEN: We didn't have any
4 information on when that was done.

5 MR. RAMSPOTT: That's right. I
6 just saw this email about five minutes ago.

7 MR. ALLEN: The estimate that we
8 had for the radium was higher than what we had
9 for St. Louis Testing. So we didn't consider
10 it anymore.

11 CHAIRMAN ZIEMER: Okay.

12 MR. ALLEN: Iridium was the
13 limiting in our estimate.

14 CHAIRMAN ZIEMER: Right. But it
15 sounds like, based on this date, that St.
16 Louis Testing might have been there after the
17 radium sources. So we may have to take that
18 into consideration.

19 Yes, the dates on St. Louis Testing
20 apparently were not that well spelled out.
21 But did you specify -- well, you ended up not

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1 assigning any St. Louis dose because the
2 radium became bounding. Is that what you are
3 saying?

4 MR. ALLEN: Prior to '62.

5 CHAIRMAN ZIEMER: Prior to '62, the
6 radium was greater than what they would have
7 gotten from St. Louis Testing, but --

8 MR. RAMSPOTT: The radium's gone in
9 '64.

10 CHAIRMAN ZIEMER: But the radium is
11 gone in -- yes. The radium leaves I think in
12 '62.

13 Now Josie had a question on the
14 radium, though.

15 MEMBER BEACH: No, I didn't have a
16 question. I actually have a comment.

17 CHAIRMAN ZIEMER: Sure.

18 MEMBER BEACH: I believe that the
19 Work Group should pursue an SEC for the early
20 period 1953 to 1962 for external. That is my
21 opinion. We have been doing this for three or

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1 four years now, and I think we should go for
2 the SEC and then concentrate on '62 to '66.
3 That is my opinion.

4 CHAIRMAN ZIEMER: Right. And one
5 of the issues, of course, on the SEC, at least
6 for many of us, is the extent to which there
7 was rad control in place, which is sort of
8 still in question in terms of both film badges
9 and practices.

10 The other part of it is, let's say
11 we said okay they can't reconstruct radium
12 with sufficient accuracy. If we go for an
13 SEC, that is always coupled with what can you
14 reconstruct for those workers who are not in
15 the 250 day plus, which would be betatron
16 stuff, which we don't have that piece yet. So
17 we don't have the pieces that could be
18 reconstructed for an SEC. That is part of the
19 problem. It is part of what happens when you
20 chop this into pieces.

21 But I hear what you are saying

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1 because concern about the uncertainties in the
2 radium era.

3 DR. ANIGSTEIN: Now about the
4 betatron, what happens there is prior -- we
5 are talking about the '53 to '62 period.
6 Right?

7 CHAIRMAN ZIEMER: Right.

8 DR. ANIGSTEIN: So at that time,
9 they only had the old betatron.

10 CHAIRMAN ZIEMER: The first
11 betatron, right.

12 DR. ANIGSTEIN: So it was used
13 less. It was completely remote from the other
14 buildings. So the exposure, of course there
15 is always some exposure to the betatron
16 operators, but there would have been a much
17 smaller exposure during that period.

18 DR. MAURO: Would it be a different
19 location, different people?

20 DR. ANIGSTEIN: Pardon?

21 DR. MAURO: Different people? I

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1 guess I didn't follow that quite.

2 DR. ANIGSTEIN: Well, there were
3 different people in the sense that the new
4 betatron, which is actually older than the old
5 betatron, was immediately adjacent to the
6 production building. And there was stray
7 radiation. The penumbra of the beam could
8 actually go with very little shielding right
9 into the restroom, whereas -- but that wasn't
10 built until -- it went into operation about
11 the end of '63, end of '63, beginning of '64,
12 about that time.

13 So the old betatron is like 400
14 feet away, a separate building, very well
15 shielded, nothing in-between. I think it was
16 some warehouses that were maybe 250 feet away
17 from it.

18 So the exposure from that really,
19 except for the people inside the building,
20 with the exposure outside, no reason why
21 anyone would congregate outside the building.

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1 People would come in, do some other routine
2 work.

3 MEMBER BEACH: It would be a low
4 minimum concern, really.

5 MR. RAMSPOTT: Dr. Ziemer?

6 CHAIRMAN ZIEMER: Yes, hang on just
7 a second. In any event, the years from '52 or
8 '53 to '62 are the ones I think Josie is
9 talking about.

10 In '62 we can see it is very clear
11 in terms of a radiation safety program and the
12 change in the sources and some other things,
13 the kind of delineation between sort of the
14 periods, which takes us -- and that's in the
15 middle of the operational period.

16 So ironically, this pretty much
17 hinges on where we come down on the radium
18 issue, which ironically, although it is there,
19 is not even part of the AEC program. But we
20 have to consider it. It is one of those
21 ironies of this program that it is only the

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1 betatrons that are part of the thing that
2 makes this a covered facility. The radium, in
3 a sense, is outside that, but it has to be
4 considered under the law because it
5 contributes to worker exposure.

6 But in any event, that is where we
7 have to sort of make that delineation. And
8 the question is, it is kind of boiling down
9 to, were there radiation controls during that
10 period and if so, were they adequate?

11 And the St. Louis Testing part of
12 that -- see we think St. Louis Testing was
13 involved during those early days where they
14 brought in sources. The radium is there but
15 the St. Louis thing was coming in also during
16 that period.

17 MR. ALLEN: We don't know.

18 CHAIRMAN ZIEMER: We think.

19 DR. ANIGSTEIN: No, no. There is
20 no reason to believe. I don't believe so. I
21 don't believe St. Louis Testing came in. I

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1 think they told us. John Sinn said --

2 [Identifying Information Redacted] said --

3 MR. RAMSPOTT: It came in '64.

4 DR. ANIGSTEIN: -- '64.

5 CHAIRMAN ZIEMER: Only?

6 DR. ANIGSTEIN: Pardon?

7 CHAIRMAN ZIEMER: Only '64?

8 MR. RAMSPOTT: Forward.

9 MR. ALLEN: Starting in '64.

10 CHAIRMAN ZIEMER: Starting in '64.

11 Okay. I didn't get that out of what you were
12 saying. I thought you were saying you thought
13 they were pre-'62, NIOSH was assuming pre-'62.

14 MR. ALLEN: In our write-up we did.
15 That came out today. John Ramspott.

16 CHAIRMAN ZIEMER: Oh, yes. Okay.
17 But in the material we had it was saying that
18 it was pre-'62, which would have been
19 concurrent with the radium era.

20 MEMBER BEACH: Did you say when?
21 When pre-'62? I don't remember that in your

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1 report.

2 CHAIRMAN ZIEMER: I'm sorry.

3 MEMBER BEACH: Did you give a date?

4 MR. ALLEN: No.

5 CHAIRMAN ZIEMER: They said they
6 didn't know the dates but they assumed it was
7 pre-62.

8 MR. ALLEN: We didn't know.

9 MEMBER BEACH: Okay. Just to be
10 clear.

11 MR. ALLEN: We assumed the whole
12 time frame it could have been.

13 MEMBER BEACH: Okay.

14 CHAIRMAN ZIEMER: But if they were
15 actually used in '64, do we know wasn't it a
16 limited period of time when they came in, like
17 six months?

18 MR. ALLEN: He said the energy was
19 ten shots over a six-month period. He never
20 said it was only that six months or if that's
21 just a particular snapshot in time he was

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1 talking about.

2 MR. RAMSPOTT: I would suggest
3 somebody talk to [Identifying Information
4 Redacted].

5 CHAIRMAN ZIEMER: Well, let's see.
6 Robert, you interviewed [Identifying
7 Information Redacted], didn't you?

8 DR. ANIGSTEIN: Yes, I did.

9 CHAIRMAN ZIEMER: Did he indicate
10 that they were only there during that six-
11 month period?

12 DR. ANIGSTEIN: Six month period?
13 No, they were there for years.

14 CHAIRMAN ZIEMER: Well, that's what
15 we are asking.

16 DR. ANIGSTEIN: No, they were
17 there. Now, I did not specifically focus on
18 the time period.

19 CHAIRMAN ZIEMER: Well, it seems to
20 me --

21 DR. ANIGSTEIN: My impression --

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1 CHAIRMAN ZIEMER: -- we need to
2 know that because St. Louis Testing, as it
3 currently stands, their contribution is not
4 included in the later years. Is that correct?

5 DR. ANIGSTEIN: In the radium
6 years.

7 MR. ALLEN: No. It's there. We
8 assumed they were there the whole time is what
9 we assumed.

10 CHAIRMAN ZIEMER: I thought you
11 were saying only pre-'62.

12 MR. ALLEN: No. I said including
13 pre-'62.

14 CHAIRMAN ZIEMER: Oh, I got you. I
15 got you. I read it wrong then.

16 MR. ALLEN: It wasn't the limiting
17 thing pre-'62.

18 CHAIRMAN ZIEMER: Got you. I got
19 you.

20 MR. ALLEN: So it was fairly
21 irrelevant, at least for this moment.

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1 DR. MAURO: This is John. John,
2 Josie raised a question before that I didn't
3 quite track. You have the radium period,
4 let's assume '53 to '62. And it is occurring
5 in a certain location and certain people are
6 being exposed. Whether or not you feel you
7 can reconstruct those doses or not is an issue
8 before us, the assumptions and what controls
9 are in place.

10 What I heard also was that at the
11 same time, there is a betatron operation going
12 on and that is the reason why this --

13 CHAIRMAN ZIEMER: Right.

14 DR. MAURO: However, what I didn't
15 quite understand is the people where the
16 betatron operation was going on, was that
17 also, are the same people involved, the same
18 location involved where the radium operations
19 are going on or are we really separate?

20 So by not being able to address --
21 see right now we still have to talk about the

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1 betatron. And if it turns out that an SEC --
2 I'll make it hypothetical. Let's say an SEC
3 is granted for a time period for this reason,
4 the radium was difficult to reconstruct.
5 Hypothetical. Well, that then poses the
6 question, what do you do for the partial dose
7 reconstruction? You have to at least be able
8 to do the betatron contribution --

9 CHAIRMAN ZIEMER: Exactly.

10 DR. MAURO: -- unless there was no
11 betatron contribution to the people who fall
12 within the category of the radium exposures.
13 Did you see why I'm questioning it?

14 CHAIRMAN ZIEMER: If you don't know
15 that operator, you don't know that.

16 DR. MAURO: If we don't know that.

17 DR. ANIGSTEIN: You can't rule it
18 out. I think I can answer this question.

19 DR. MAURO: Okay.

20 CHAIRMAN ZIEMER: Well, before you
21 do, remember on the radium we don't know, at

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1 this point, where that radium was used in the
2 facility.

3 DR. MAURO: Okay.

4 CHAIRMAN ZIEMER: At least we have
5 said that, number one.

6 Number two, there is one person,
7 and maybe it has to be re-interviewed, who was
8 around during the radium era who could answer
9 several questions. One is, where were the
10 radium sources used? And two, was there a
11 boundary set up either at the 2 -- rem per
12 hour limit or at one and a half times that at
13 least during that person's time of practice?

14 I think we already know that person
15 has some dosimetry records. Isn't that
16 correct?

17 DR. MAURO: Yes.

18 CHAIRMAN ZIEMER: But it seems to
19 me that unless Dr. McKeel or Mr. Ramspott
20 already has this information, we need to know
21 from that person who worked with the radium

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1 sources where they were used. Were they used
2 throughout the plant or in a certain location,
3 number one? And number two, what was the
4 practice on restricting access to that?

5 Did Dr. McKeel get back on the
6 line?

7 DR. McKEEL: I am back, Paul. I
8 did send the Work Group both the [Identifying
9 Information Redacted] 1962 record that I
10 mentioned --

11 CHAIRMAN ZIEMER: Thank you.

12 DR. McKEEL: -- and also I sent
13 that picture of that 1953 worker --

14 CHAIRMAN ZIEMER: Great.

15 DR. McKEEL: -- at the betatron
16 wearing a film badge.

17 CHAIRMAN ZIEMER: Okay.

18 DR. McKEEL: I personally have not
19 learned from [Identifying Information
20 Redacted] your two questions and I think they
21 are highly relevant. And I strongly think it

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1 would be good to do a focused re-interview
2 aimed at both of those questions. He is one
3 of the few people who could answer that for us
4 directly.

5 MR. KATZ: Right, Dan. And at the
6 break I asked Bob to go ahead and do that, to
7 re-interview him on those points. So well, on
8 the latter. Now both points.

9 DR. McKEEL: Okay.

10 MR. KATZ: So that will get done
11 and that should be able to be done pretty
12 quickly.

13 DR. NETON: I wonder if the
14 question was asked also does he know if he
15 wore a film badge or not. I mean, that would
16 be a very --

17 CHAIRMAN ZIEMER: Well, I think we
18 know he did. Right?

19 DR. NETON: Well, not before 1962.

20 CHAIRMAN ZIEMER: Oh, yes. Okay.

21 DR. McKEEL: Yes. No, --

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1 MR. RAMSPOTT: No, he told me
2 yesterday --

3 DR. NETON: That he did?

4 MR. RAMSPOTT: -- that he wore a
5 film badge from day one.

6 DR. NETON: Okay, that is good to
7 know. Thank you.

8 DR. McKEEL: May I make a
9 suggestion?

10 CHAIRMAN ZIEMER: Yes.

11 DR. McKEEL: Since NIOSH is writing
12 this paper and has to deal directly with the
13 radium issue, would it be possible for a
14 representative from NIOSH like Dave Allen to
15 be present at that interview so that we don't
16 have any -- you know, those interviews are not
17 recorded verbatim. So we don't have any
18 record of exactly the way the questions are
19 asked. So I think it would be good to have
20 somebody from NIOSH and somebody from SC&A on
21 the phone at the same time listening to and

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1 asking questions to get at what we are after.

2 CHAIRMAN ZIEMER: I think we can do
3 that. And I suspect if the petitioner wanted
4 to be on the line, that would be all right,
5 would it not?

6 MR. KATZ: Yes, that would be fine,
7 too, as long as it is just up to the
8 interviewee really that he is willing to have
9 -- I think Bob was saying that he is willing
10 to speak to Bob. If he is willing, there is
11 no problem with that whatsoever.

12 MR. ALLEN: Yes, no problem.

13 DR. McKEEL: Okay, that would be
14 fine with me.

15 DR. MAURO: I'm sorry. I was
16 writing down --

17 MR. ALLEN: It's all right.

18 DR. MAURO: Is [Identifying
19 Information Redacted], [Identifying
20 Information Redacted], is that what it is?

21 MR. RAMSPOTT: [Identifying

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1 [Information Redacted].

2 DR. MAURO: [Identifying
3 Information Redacted].

4 MR. RAMSPOTT: [Identifying
5 Information Redacted].

6 DR. MAURO: And the action item for
7 SC&A is --

8 CHAIRMAN ZIEMER: That's on St.
9 Louis Testing.

10 DR. MAURO: Okay. Now --

11 CHAIRMAN ZIEMER: This interview is
12 with the person we are calling [Identifying
13 Information Redacted] I think he is probably
14 still identifiable with that for now. He
15 would be questioned on the early practices
16 with radium, namely, how was the area
17 restricted. Did they use the one and a half
18 times the two millirem distance? And we have
19 already been told they used film badges but we
20 need to have that officially in the record as
21 well.

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1 MR. KATZ: And the location of
2 where this work occurred.

3 CHAIRMAN ZIEMER: And the location.
4 And where, for example, were the radium
5 sources only used in the old betatron? I
6 suspect not but we need to find out that.

7 DR. MAURO: Okay. Now that was for
8 [Identifying Information Redacted]

9 CHAIRMAN ZIEMER: Right.

10 DR. MAURO: For [Identifying
11 Information Redacted], the questions regarding
12 St. Louis were what?

13 MEMBER BEACH: The years on-site.

14 DR. MAURO: The years, okay.

15 MR. KATZ: The years of operation
16 of the betatron.

17 DR. MAURO: The years St. Louis was
18 on-site. And that's it.

19 MR. KATZ: Right. And so I think
20 Bob will go forward and set up an interview
21 and consult with Dave Allen about whether Dave

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1 can join him.

2 CHAIRMAN ZIEMER: And let the
3 petitioner know when that is scheduled.

4 MR. KATZ: Absolutely.

5 CHAIRMAN ZIEMER: Okay.

6 MR. KATZ: And we hope to do that
7 quickly. Soon.

8 CHAIRMAN ZIEMER: Now, so I guess
9 and, Josie, I don't know if you were making a
10 formal motion.

11 MEMBER BEACH: No, I was not.

12 CHAIRMAN ZIEMER: I think you were
13 expressing your view on that.

14 MEMBER BEACH: Just my thinking.

15 CHAIRMAN ZIEMER: But I think I
16 will have to say that on the radium piece, we
17 need these additional pieces of information
18 before the Work Group can come to closure on
19 that.

20 The St. Louis Testing, it appears
21 to me already that the model may have to

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1 change a little bit, since at least -- well,
2 maybe not. You continued it on through. I
3 misread how you were doing that. So is there
4 anything else? You want to talk about that
5 model at all? Is there anything on there that
6 you, I mean, assumptions that you want to talk
7 about?

8 You have the source strengths. We
9 want to confirm that, I guess, in terms of
10 their license.

11 MR. ALLEN: We're going to try to
12 find the St. Louis Testing licenses and that
13 should confirm.

14 CHAIRMAN ZIEMER: Confirm the
15 activities.

16 MR. ALLEN: With the NRC, there is
17 no guarantee of success but we will try to.

18 CHAIRMAN ZIEMER: I would point out
19 to you that often the license value is
20 different from the actual use. You'll notice,
21 for example, in most folks that do licenses,

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1 and I did the same thing, you usually get a
2 bigger number because you don't want to be
3 over.

4 So for example, GSI did this. They
5 got licensed for two 300 millicurie sources of
6 cobalt but that is not the actual activity.
7 They were two something, you know, two
8 different ones.

9 St. Louis Testing may have the
10 license that is different from the actual
11 numbers. So there is really two things we
12 need to know. What were they licensed for and
13 what did they actually have?

14 MR. ALLEN: Well, we will ask NRC
15 for any information they have.

16 CHAIRMAN ZIEMER: Yes, so we will
17 get the NRC information on that. But what
18 about the model itself? What else do you want
19 to say on the St. Louis Testing part of this?

20 MR. ALLEN: It was a pretty simple
21 model. It was based on [Identifying

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1 [Information Redacted]'s account that they
2 roped off an area at 2 millirem -- 2 mR per
3 hour and that he did shots, I may get it
4 wrong, I think it was Westinghouse castings
5 but I may be wrong. He did say there were
6 long shots that lasted for one week and half a
7 day or 180 hours. He remembered that number.

8 MEMBER MUNN: That would have been
9 a Westinghouse casting, yes.

10 MR. ALLEN: Obviously something
11 large. And he said that they did ten such
12 shots over a six-month period.

13 In our model, we took that to mean
14 a rate rather than just the six-months of
15 operations. We assumed that they were
16 continuing to do that every six months. We
17 did not have any time frames. So we took it
18 all the way from '53 through '66 that they
19 were doing this. The information today
20 indicates it should start later than that.

21 And that is about all I've got on

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1 that for now.

2 MR. RAMSPOTT: Dr. Ziemer?

3 CHAIRMAN ZIEMER: Yes, sir.

4 MR. RAMSPOTT: Yes, I just heard
5 something there that Dave was saying about the
6 frequency of shots.

7 CHAIRMAN ZIEMER: Yes.

8 MR. RAMSPOTT: And there is a real
9 big piece of this that everybody is missing,
10 I'm afraid. All bets are off after 1963 when
11 Eddystone moved to General Steel. So when the
12 Eddystone plant closed, which was larger than
13 Granite City, it relocated to Granite City and
14 volumes doubled, to say the least. So to use
15 anything from '63 to establish any frequency
16 of shots or activity or I would think even
17 sources would be way off base.

18 The other piece is that when it
19 comes to radium, General Steel in 1962 bought
20 St. Louis railcar which they were contracted
21 to do 1800 subway train cars for the New York

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1 Transit Authority. And according to Mr.
2 Burgess now deceased, the manager over the
3 betatron which everybody seems to take what he
4 says as gospel, the main reason for that
5 cobalt and the frequency of testing was for
6 that big contract.

7 So radium, it doesn't impact. The
8 radium is much -- well, it would. But it
9 really, since it is 1962, it doesn't impact
10 the radium but it definitely impacts trying to
11 use radium volumes to determine cobalt
12 exposures. And that is all verifiable, those
13 contracts. I looked them up again last night.

14 CHAIRMAN ZIEMER: Okay.

15 MR. ALLEN: John, this is Dave
16 Allen. We were talking about St. Louis
17 Testing and the information we got from
18 [Identifying Information Redacted]. So the
19 other information you were saying today about
20 them starting in 1964, then this should be
21 post-1964 information that he gave us.

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1 MR. RAMSPOTT: Yes, but just now I
2 thought I heard you say something about who
3 are you talking about, the St. Louis Testing
4 exposures exclusively being used through '68
5 or are you trying to determine General Steel's
6 own --

7 CHAIRMAN ZIEMER: No, just the
8 contribution of St. Louis Testing exposures --

9 MR. RAMSPOTT: Then I'll agree with
10 you.

11 CHAIRMAN ZIEMER: -- to the
12 workers. Yes.

13 MR. RAMSPOTT: The one piece I ask
14 you to look at though is all of a sudden they
15 had cobalt outside.

16 CHAIRMAN ZIEMER: Right.

17 MR. RAMSPOTT: That's kind of an
18 interesting little piece.

19 CHAIRMAN ZIEMER: Was that a one-
20 time thing?

21 MR. ALLEN: No, I think that is

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1 where they -- this is Dave Allen again.

2 MR. RAMSPOTT: That's something to
3 ask [Identifying Information Redacted].

4 MR. ALLEN: I think that is what he
5 said in their Collinsville meeting meetings.
6 He had to set that up outside. It was a
7 larger source. I think it was ten curies.

8 CHAIRMAN ZIEMER: Ten curies is
9 what is listed.

10 MR. RAMSPOTT: That procedure was
11 denied. General Steel being able to do in
12 those papers Dr. McKeel found.

13 MR. ALLEN: Yes, I mean it is a
14 little ironic but that would have been St.
15 Louis Testing doing it.

16 MR. RAMSPOTT: Violating an AEC
17 law.

18 MR. ALLEN: It's definitely not a
19 law. It was just they were doing the
20 radiography outside with the boundary and it
21 was after '68 or somewhere around '68 when GSI

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1 was denied doing essentially the same thing.

2 DR. ANIGSTEIN: Well, first of all,
3 it was also a much stronger source with 80
4 curies instead of ten curies.

5 MR. ALLEN: Yes, it was also the
6 State of Illinois. AEC said they would be
7 willing to consider it. They wanted some new
8 information, but GSI came back and said that
9 the State of Illinois wasn't open to the idea.
10 So they weren't pursuing it anymore.

11 DR. ANIGSTEIN: You're right.

12 MR. DUTKO: Dr. Ziemer?

13 CHAIRMAN ZIEMER: Yes.

14 MR. DUTKO: John Dutko.

15 CHAIRMAN ZIEMER: Hello, John, John
16 Dutko.

17 MR. DUTKO: I don't know I was only
18 there -- I distinctly remember -- from the old
19 -- the new betatron while I picked up my film
20 badge, I saw a St. Louis Testing worker on
21 castings between the new betatron and the old

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1 betatron. They were set up out there.

2 CHAIRMAN ZIEMER: Okay.

3 MR. DUTKO: This is more than just
4 a one-time occasion.

5 CHAIRMAN ZIEMER: Okay.

6 MR. DUTKO: Maybe we better check
7 with NIOSH but I was only there. Maybe we
8 better check with NIOSH.

9 CHAIRMAN ZIEMER: Yes, we are also
10 checking with St. Louis Testing. That appears
11 to be a regular setup.

12 MR. DUTKO: Dr. Ziemer, 1964 to '66
13 was the heaviest period of their operation.
14 We had spillover work. You could check with
15 Mr. Sinn. They were in and out periodically
16 working on spillover work.

17 CHAIRMAN ZIEMER: '64 to '66?

18 MR. DUTKO: Yes, sir. I left in
19 November of '66.

20 CHAIRMAN ZIEMER: Okay, very good.

21 Okay, Bob, let's hear what you have to say

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1 about St. Louis Testing. Do you have
2 anything?

3 DR. ANIGSTEIN: Well, it is just
4 that we -- I'm not sure I understood
5 correctly. It was not a one time --

6 CHAIRMAN ZIEMER: No.

7 DR. ANIGSTEIN: -- they were there.
8 And I think actually what we said was over a
9 six-month period they did however many
10 exposures. Maybe they were only there for six
11 months. Dave assumed, you know, prorated that
12 which was more claimant-favorable. But it may
13 have only been for six months. I'm not sure.
14 Is that something to check on?

15 CHAIRMAN ZIEMER: Well, I think we
16 can ask the question, but I think Dave has
17 assumed that they continued on through.

18 DR. ANIGSTEIN: Yes.

19 CHAIRMAN ZIEMER: If they started
20 in '64, that is the start date is going to be
21 clarified. But you assume they were there

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1 throughout the rest of the operational period.

2 Right?

3 MR. ALLEN: Yes. I actually
4 assumed starting in '53.

5 CHAIRMAN ZIEMER: Yes, you did.
6 But now it looks like they may have started
7 later.

8 DR. ANIGSTEIN: I am still puzzled
9 about this focus on St. Louis Testing where at
10 least NIOSH and SC&A, this is one area we are
11 in close agreement, we have a small difference
12 in the modeling approach. But we do not
13 disagree about the input information.

14 So more information is not really
15 going to resolve anything because it is not an
16 issue here.

17 MR. ALLEN: The time frame, we
18 should probably zero in on that and maybe a
19 short phone call --

20 DR. ANIGSTEIN: Yes. Now for
21 instance if St. Louis Testing had been there

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1 from the beginning from '53 on, that would
2 resolve this partial dose reconstruction issue
3 during that time period. But I don't think
4 so.

5 CHAIRMAN ZIEMER: The only other
6 thing that could change it and that would be
7 if you are sort of looking for independent
8 verification of the source sizes. Right? Or
9 do we already have that?

10 MR. ALLEN: No. Well, we have that
11 from [Identifying Information Redacted]
12 already. So I don't know if Paul is going to
13 change that.

14 CHAIRMAN ZIEMER: We have that
15 verbally?

16 MR. ALLEN: Yes. So a phone call
17 is probably not going to change that.

18 CHAIRMAN ZIEMER: Okay, got you.

19 DR. ANIGSTEIN: And also, it was a
20 big operation. So even say we were to get the
21 AEC licensing records, they would have a

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1 number of sources, I am sure. And we wouldn't
2 know which source pertained to which facility.
3 So it might muddy the waters more than it
4 would --

5 MR. ALLEN: Well, I mean ideally
6 we'd see a number of licenses. And you may
7 see something that resembled a 10-curie cobalt
8 and a 50-curie iridium and you would say that
9 relates with what [Identifying Information
10 Redacted] told us. Therefore, even with two.
11 But anytime you expect clarification, it
12 generally gets muddier. So we will see what
13 happens.

14 CHAIRMAN ZIEMER: Well, at the
15 moment, both SC&A and NIOSH are in general
16 agreement on how you would model the St. Louis
17 Testing portion, based on the sources sizes
18 that we both believe were there.

19 DR. ANIGSTEIN: Yes, the main
20 disagreement is the assumption, two
21 assumptions. One is I did not find a

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1 reference, but again, that doesn't mean that
2 it is not correct, that the GSI radiographers
3 -- actually, there were two categories of
4 exposed people. There were GSI radiographers
5 who assisted St. Louis Testing. I did not
6 have the impression that that was the case.

7 And secondly, that the non-
8 radiographers were only there half the time.
9 My approach would be the claimant-favorable, a
10 simple bounded claimant-favorable approach.
11 Somebody was at that boundary all the time
12 that the sources were used, which is not full-
13 time. There is only a fraction of your -- a
14 41 percent fraction of the time. And that
15 periodically because there was only one
16 radiographer, not two, there were two
17 radiographers for a day, 12-hour shifts,
18 obviously he would be taking a break and
19 leaving the area once in a while. And the
20 worker would walk across that perimeter to get
21 to the other side. Why did the chicken cross

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1 the road?

2 And you will get some additional
3 exposure, not huge. Because, I just assumed
4 that would happen maybe once a day and that 41
5 percent factor. And I used pretty much the
6 same technique that they used, but a little
7 different. I used a rate to set up I have a
8 drawing of it.

9 Just assume that here is the
10 worker, here is the source. And at random, he
11 would go in different directions. Once a day,
12 he would cross the thing but not exactly over
13 the source, but in different directions, and I
14 just continuously varied his angle. And I
15 come up with an additional contribution of 133
16 millirem a year.

17 So instead of the two, there was
18 just a slight difference in the calculation.
19 Instead of the two point, 2.7, let's just
20 round off, it comes out to 2.8. Not a big
21 difference.

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1 The big difference is that I would
2 assign this rate for all workers. We don't
3 know who might have been there for whatever
4 reason his work required him to be at that
5 periphery. It is a limiting case. It doesn't
6 sort of mean it actually happened but that is
7 how we bound the estimates.

8 So I would give it a bounding
9 estimate during this period of only one day.

10 CHAIRMAN ZIEMER: And that seemed
11 to be the main difference in the two. Dave,
12 have you had a chance to think about that and
13 do you have any response at the moment?

14 Applying it to all of the workers
15 sort of intuitively doesn't seem right. But
16 if you don't know who it is, what do you do, I
17 guess is the question that you are raising?

18 MR. ALLEN: The assumptions I made
19 in my model were that this is outdoors, as
20 John Ramspott was saying. It is in Illinois.
21 It is winter, rain days, et cetera. People

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1 generally that don't have a reason to be
2 there are not going to be there 100 percent of
3 the time. I would try to give them a
4 favorable factor of 50 percent of the time,
5 they are right there at this boundary. It is
6 somewhat arbitrary.

7 I said I don't know if I can make
8 that assumption for radiographers because if
9 there was supposedly one guy watching this
10 boundary 12 hours straight, I am guessing that
11 they had some help from GSI workers, at least
12 to watch the boundary.

13 CHAIRMAN ZIEMER: Enforce the
14 boundary.

15 MR. ALLEN: So I said the
16 radiographers would be the likely ones because
17 they seem to know this guy. They seem to work
18 with him somewhat. And so I said
19 radiographers, I can't really say that is a
20 favorable assumption. So I gave them 100
21 percent of the time at the boundary.

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1 CHAIRMAN ZIEMER: So all
2 radiographers and Bob is suggesting everybody
3 in the plant.

4 DR. ANIGSTEIN: Well, we don't know
5 it would be a radiographer, because there was
6 even an issue that -- I think it was John
7 Dutko who raised that issue, that all the GSI
8 workers were unionized, I think they had like
9 four different unions there. And there is
10 something about the union workers don't work
11 with non-union workers. And the St. Louis
12 Testing were non-union. And the union had to
13 actually give consent to have the St. Louis
14 Testing come in and share their work but
15 because they were overloaded --

16 CHAIRMAN ZIEMER: Did anybody ever
17 ask [Identifying Information Redacted] about
18 this issue?

19 MR. ALLEN: In the interview in
20 Collinsville, he said it was kept under
21 constant surveillance. So I believe he did

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1 say it was two 12-hour shifts and two
2 radiographers, which, 12 hours in one shot is
3 quite a lot.

4 DR. ANIGSTEIN: Well, when I
5 interviewed him, he said there was only one
6 radiographer at a time. Because I asked him:
7 were there two at the same time? He said no,
8 there were two, meaning two 12-hour shifts,
9 one each. There were two people, one working
10 the day shift, one working the night shift.

11 CHAIRMAN ZIEMER: But did anyone
12 ever raise the question, you know, if you take
13 a break, what do you do? Is it unobserved or
14 do you bring somebody in? I mean, if you are
15 going to talk to him again, can we ask him
16 that?

17 MR. ALLEN: I got that written
18 down.

19 CHAIRMAN ZIEMER: Yes.

20 DR. ANIGSTEIN: They did not bring
21 someone in from the St. Louis Testing place

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1 because they said they were --

2 CHAIRMAN ZIEMER: No, no. No, I'm
3 talking about GSI people or anybody.

4 DR. ANIGSTEIN: Did they bring
5 somebody in?

6 CHAIRMAN ZIEMER: Did they bring
7 anybody in?

8 DR. ANIGSTEIN: Okay. The
9 difference is actually not terribly
10 significant. As you see, I mean, there is an
11 additional 133 millirem a year that I
12 postulate for the bound intrusion.

13 CHAIRMAN ZIEMER: No, I'm not
14 talking about intrusion.

15 DR. ANIGSTEIN: We're not talking
16 about that, no.

17 CHAIRMAN ZIEMER: Okay. Well, the
18 intrusion is --

19 DR. ANIGSTEIN: Why would anyone be
20 there the whole time? See, this 50 percent, I
21 have a real problem. We have a real problem

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1 with that 50 percent.

2 Once you start -- say 100 percent,
3 there is no problem. Well, it can't be more
4 than 100 percent. Once you say 50 percent,
5 why not 75? Why not 25? Why not 10? How can
6 you just make up a number and use that for a
7 dose reconstruction when there is no
8 scientific basis for it? That -- I have a
9 problem.

10 100 percent is a bounding estimate.
11 But as long as you call it a bounding
12 estimate, it seems like a reasonable thing to
13 use. It is plausible. It can't be more than
14 that.

15 Once you start reducing it by a
16 factor of two, just like with the
17 radiographers using radium, well, we will
18 assume there were two radiographers. There is
19 no basis for that.

20 MR. ALLEN: And the basis for one
21 intrusion per day was what?

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1 DR. ANIGSTEIN: Well, that's again,
2 that is a judgment call. One intrusion a day
3 is meaning the guy is only going to take a
4 break --

5 MR. ALLEN: Fifty percent is a
6 judgment call.

7 DR. ANIGSTEIN: Yes, I know.

8 MEMBER MUNN: And it's common sense.

9 DR. ANIGSTEIN: The one thing I
10 would say is, the person, the man works 12
11 hours. He is not going to be on break more
12 than an hour during those 12 hours. And that
13 during that time, the worker is not going to -
14 - the other guy is not going to be there, oh,
15 he is away. Now I can go in.

16 MR. ALLEN: Well, the judgment call
17 for 50 percent is there is no reason for
18 somebody to be there at all, so half of their
19 work day doing nothing is pretty favorable.

20 DR. ANIGSTEIN: I know. It is not
21 a question about favorable. It is that it is

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1 not --

2 MR. ALLEN: Well, yes it is. You
3 said 100 percent is favorable. You can't do
4 better than that so that is okay. It's a
5 judgment call, but 50 percent is very
6 favorable.

7 CHAIRMAN ZIEMER: Well --

8 DR. ANIGSTEIN: We are not
9 bargaining, you know, how much are you going
10 to give me? You know, are you going to give
11 50 percent?

12 MR. ALLEN: I'm just saying 50
13 percent is a number that all reasonable people
14 could agree is favorable.

15 DR. MAURO: Neither of you are
16 being unreasonable. I understand what is
17 going on. I think we are arguing over a point
18 that cannot be resolved.

19 This is a judgment call. You are
20 certainly being reasonable. Bob, you are just
21 being bounding and saying, listen, you can't

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1 take a number. So what are you going to do?
2 You have no choice. You don't have the
3 luxury, so you have no choice but to go. But
4 of course, everyone agrees 100 percent
5 probably may not be plausible.

6 So, I mean, we are arguing a point
7 that I don't think we should be arguing.

8 CHAIRMAN ZIEMER: You are having
9 non-radiographers standing at the border 100
10 percent of the time. They can't be doing
11 that. That is not their job. And they can't
12 --

13 DR. ANIGSTEIN: Well, unless there
14 was some work location for some reason where
15 they needed to be there. You know.

16 MEMBER MUNN: Well, they wouldn't
17 be there for 12 hours.

18 DR. ANIGSTEIN: It could even be --

19 CHAIRMAN ZIEMER: If the boundary
20 went through or at a work location, I guess
21 that is what you are saying. Right?

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1 DR. ANIGSTEIN: The boundary, if
2 you use -- if you were to take that boundary
3 without a source, without the presence of the
4 casting, and you were to simply -- I have a
5 spreadsheet here. Let me locate it. Yes. I
6 don't have it right here.

7 It was something like, from memory,
8 at least 200 feet was the radius. It would be
9 10 mR --

10 CHAIRMAN ZIEMER: Two mR?

11 DR. ANIGSTEIN: The 2 mR per hour.
12 I had it in here then I don't have it anymore.

13 CHAIRMAN ZIEMER: Well, we don't
14 need all of the exact stuff now.

15 What this boils down, and John has
16 suggested part of it is, what do you assume is
17 reasonable for bounding? Are you going to
18 assign everybody 100 percent of the boundary
19 dose or 50 percent of the boundary dose? What
20 is reasonable?

21 You know, it doesn't seem

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1 reasonable that someone would be there 100
2 percent of the time unless you could show that
3 the boundaries are going through a work area.
4 And I guess, if we know where locations are,
5 maybe that could be resolved.

6 To me, even 50 percent is not
7 reasonable. You can't have people standing
8 around the boundary watching this thing. It
9 is like watching paint dry. There is nothing
10 to see.

11 MEMBER MUNN: Nothing is happening.

12 DR. ANIGSTEIN: The radius, by the
13 way, is 81 meters. So we are talking about
14 250 feet. So there could even be a building -
15 -

16 CHAIRMAN ZIEMER: Well, that --

17 DR. ANIGSTEIN: -- within that
18 range.

19 CHAIRMAN ZIEMER: Well, if we know
20 where this was done maybe -- can that be
21 answered or not? I don't know.

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1 MR. ALLEN: If I remember right,
2 [Identifying Information Redacted] said they
3 did this outside to avoid interfering with
4 work. You know, it is like you set up a large
5 area outside without interfering. And they
6 had that --

7 MEMBER BEACH: Was it always 100
8 percent of the time outside?

9 MR. ALLEN: These 180-hour shots.

10 MEMBER MUNN: Oh, the great big
11 ones.

12 MR. ALLEN: The big Westinghouse
13 castings and the boundary wouldn't have been
14 quite that big because it would be inside that
15 casting --

16 CHAIRMAN ZIEMER: Yes.

17 MR. ALLEN: -- with quite a bit of
18 shielding. But yes, they set it up on a, if I
19 remember right, on a railroad spur. They put
20 a big casting there, set it up outside so it
21 wouldn't interfere with everything else.

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1 Somewhere remote, essentially, which they were
2 shooting for, which makes sense.

3 CHAIRMAN ZIEMER: Yes. But it
4 sounds like this part of it is going to come
5 down to agreeing on what is a reasonable
6 assumption you can put a bound on.

7 DR. MAURO: Yes, I would call this
8 not an SEC issue. And I do that all the time.
9 It is clear that you just have to make a
10 judgment that it is prudent.

11 I am wondering about something
12 here. Whatever happened to the film badge
13 data that we have at this time? Is that part
14 of the equation here? I mean, we have the
15 calculation but now we also talk about when we
16 have data for real people. Is that part of
17 the dose reconstruction?

18 CHAIRMAN ZIEMER: And do we have
19 the St. Louis Testing film badge data for
20 their radiographers?

21 MR. ALLEN: No. That we don't

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1 have. Like I said, the idea that they started
2 in 1964 was a new concept today here. We
3 didn't have a good solid time frame, so I
4 couldn't assume that this was during the film
5 badge day.

6 CHAIRMAN ZIEMER: If you are
7 talking to St. Louis Testing, that is on the
8 schedule. Right?

9 MR. ALLEN: Yes, as far as --

10 CHAIRMAN ZIEMER: Can we find out
11 who did their film badges and whether that is
12 available? Wouldn't that help? If they are
13 there, are they on their -- my guess is they
14 are on their own film badge system.

15 MEMBER BEACH: So is that the 89
16 that we had for GSI workers that we are
17 talking about or is that something separate?
18 It was like film badges for 89 people.

19 MR. ALLEN: He is definitely not on
20 that list. So I mean, that was customer
21 number four GSI or General Steel Casting. I

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1 don't remember that time frame, but that was
2 Landauer Testing before then.

3 And Phil thinks there is not a name
4 on that list. So, I am assuming that
5 typically with the radiographers that would go
6 from place to place, they will have their own
7 film badge system. And I am assuming they
8 did.

9 CHAIRMAN ZIEMER: Let me ask this
10 question. This is sort of generic. If Sinn's
11 or Senn, it is. Right?

12 DR. ANIGSTEIN: Sinn.

13 CHAIRMAN ZIEMER: Senn, S-E-N-N.

14 DR. ANIGSTEIN: S-I-N-N.

15 CHAIRMAN ZIEMER: S-I-N-N. Sinn,
16 if he spent 250 days on this site over that
17 period of time, is he -- because he would be
18 under contract to do this work --

19 DR. NETON: A subcontractor.

20 CHAIRMAN ZIEMER: A subcontractor -
21 - or were only the betatrons covered here?

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1 DR. NETON: Only AWE employees are
2 covered at AWE sites.

3 CHAIRMAN ZIEMER: Okay, so he
4 wouldn't be covered in any event.

5 DR. ANIGSTEIN: In any case, he was
6 not a radiographer. He was an administrator.
7 He wasn't there.

8 CHAIRMAN ZIEMER: Okay, but --

9 DR. ANIGSTEIN: He wasn't there.

10 CHAIRMAN ZIEMER: But he might know
11 who was doing that. And their radiographer
12 data, even though they are not eligible, might
13 give us some information if they're at the
14 boundaries. Just a thought to check out.

15 DR. ANIGSTEIN: Yes, there would
16 not be -- I mean, if they were regular
17 radiation workers employed by a licensed
18 facility, they would be carrying, my
19 experience is they would be wearing their film
20 badges all day long and they would be issued
21 by St. Louis Testing because they might work

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1 for more than one site.

2 CHAIRMAN ZIEMER: That's the point
3 I am making.

4 DR. ANIGSTEIN: So there would be
5 no need for them to be under the GSI. GSI
6 would not issue them the film badges.

7 CHAIRMAN ZIEMER: Right.

8 MR. KATZ: That's understood.
9 Right?

10 CHAIRMAN ZIEMER: Yes, that's the
11 point.

12 MR. KATZ: Right.

13 CHAIRMAN ZIEMER: But that
14 information might be useful in telling us what
15 the exposures were because he is at the
16 boundary.

17 DR. ANIGSTEIN: Then you would have
18 to know the names of those people who were
19 working at -- it would not even be the same --

20 CHAIRMAN ZIEMER: I am just asking
21 whether --

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1 DR. ANIGSTEIN: And it may not be
2 the same person every day going to the same
3 site.

4 CHAIRMAN ZIEMER: All right. I'm
5 just saying we could find out whether they
6 have records for the people who worked on this
7 site. Because they say --

8 MR. ALLEN: We could pull the
9 threads and see if it leads to any useful
10 information.

11 CHAIRMAN ZIEMER: It may or may
12 not. If they say yes, these ten people did
13 this and we have their records --

14 DR. ANIGSTEIN: I would be amazed.

15 CHAIRMAN ZIEMER: Well, you never
16 know. We already know that sometimes we get
17 surprised by what is out there.

18 Any other questions on the St.
19 Louis Testing or any other comments from the
20 petitioners or the site experts, Dan, John, on
21 St. Louis Testing?

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1 MR. RAMSPOTT: No.

2 CHAIRMAN ZIEMER: We are going to
3 go ahead and take our lunch break. It is noon
4 here. We are going to break for an hour. Is
5 that enough time, 12:00 to 1:00? We will
6 reconvene at 1:00 and we will talk about the
7 portable X-rays and the cobalt radiography.

8 DR. McKEEL: Paul?

9 CHAIRMAN ZIEMER: Yes, Dan?

10 DR. McKEEL: Just one final question
11 about the St. Louis Testing interview. Is
12 that one that I could listen in on as well?

13 CHAIRMAN ZIEMER: I see no reason
14 why you couldn't.

15 MR. KATZ: As long as they are
16 amenable, absolutely, Dan.

17 DR. McKEEL: Okay. I have talked
18 to Paul before and exchanged emails with him
19 and so forth.

20 MR. KATZ: Okay, thank you, Dan.

21 DR. McKEEL: Sure.

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1 CHAIRMAN ZIEMER: Thank you.

2 MR. KATZ: Okay, we will reconnect
3 with the phone when we come back at 1:00.

4 (Whereupon, the above-entitled
5 matter went off the record at 12:00 p.m. and
6 resumed at 1:08 p.m.)

7

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1 Okay, we are ready to proceed here.
2 We want to look next at exposure model for
3 portable X-ray radiography. And again, we
4 will start with NIOSH, Dave Allen. And we
5 are looking at the two portable X-ray units
6 that are identified as being obtained, I
7 believe, in 1964 or thereabouts and,
8 therefore, available at least during part of
9 the operational period for potential
10 radiography work.

11 Dave?

12 MR. ALLEN: Yes, the exposure
13 estimate for portable X-ray machines did not
14 come down to an actual estimate of a number as
15 far as a dose.

16 From the information that we came
17 up with, it seems to be used -- there is
18 conflicting information but it seems to either
19 not have been used or used infrequently. The
20 part that doesn't seem to be contradictory is
21 that it was used in the betatron building. My

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1 conflicting information is where the controls
2 were, but it did seem to be used in the
3 betatron buildings after 1964, which is the
4 era of the film badge readings. And by all
5 reports, they always wore film badges in the
6 betatron building. So we just kind of wrote
7 that one off as being part of the mix, the set
8 of the models that will be part of the
9 betatron buildings and reconciled with the
10 dosimetry data.

11 CHAIRMAN ZIEMER: And just for
12 clarity of understanding by all concerned, and
13 I know that petitioners have often stressed
14 their desire to make sure that all the
15 exposures are accounted for, all the types and
16 routes of exposure. And this is a case where,
17 in essence as I understand it, you would be
18 saying that by accounting for larger exposures
19 and over 100 percent of a worker's time, any
20 fraction of that time that would have been
21 devoted to X-ray exposure would have been less

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1 than the number that you assigned to him and
2 therefore is claimant-favorable. Is that a
3 fair way to describe it?

4 MR. ALLEN: It's fair and it seems
5 to be a reasonable way here because it doesn't
6 appear as though they were used that often.
7 So the higher exposure would probably be the
8 more typical.

9 CHAIRMAN ZIEMER: Right. And even
10 if you knew the exact amount of time they used
11 these X-rays, you would be reducing the other
12 exposure by a little bit and putting this in
13 its place, so you would actually end up
14 reducing the number you assigned.

15 MR. ALLEN: Yes.

16 CHAIRMAN ZIEMER: Let me ask Bob
17 for comments from SC&A.

18 DR. ANIGSTEIN: First, I want to
19 make an observation on my report and that is I
20 made an error. Looking over it, I said that
21 it should be 15 -- that the dose was from the

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1 GE machine tube was miscalculated. It turned
2 out when I looked at it more carefully, that
3 Dave had found a reference which I did not
4 verify that that machine had an output of ten
5 milliamps. And I found a reference which I
6 cite which had 15 milliamps. So that was the
7 difference that we were off by a factor of one
8 and a half because he was using a different
9 tube output.

10 So I would again say if there are
11 two references, you use the one with the
12 higher one that would be more claimant-
13 favorable. Were we, and then I have to say,
14 since neither NIOSH nor SC&A attempted to
15 actually calculate worker exposure, that is a
16 moot point.

17 The other comment I have is --

18 CHAIRMAN ZIEMER: Well, are you
19 agreeing with the idea that the other
20 exposures were more --

21 DR. ANIGSTEIN: Yes, when it comes

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1 to normal usage. Now, we do have a report
2 which I documented and I think also the worker
3 was interviewed, where there was at least one
4 instance where workers were in the betatron
5 room doing whatever and someone else turned on
6 the X-ray machine without clearing the room.

7 CHAIRMAN ZIEMER: Right.

8 DR. ANIGSTEIN: Normally, the X-ray
9 machine was operated with no one in the room.
10 The operator, there was conflicting
11 information whether the controls were in the
12 control room or whether it was a timer that
13 was set and the operator would, you know,
14 there would be time delay because the late
15 former supervisor was a little vague about it.
16 He said it was portable so you could not have
17 had controls, you know, you couldn't have the
18 machine at one place and the controls at
19 another place with cables running between
20 them. So he thought that they were -- in all
21 cases, they said, the two people both agreed

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1 that it was operated from within the control
2 room or the operator was in the control room.

3 So I think that the, and certainly
4 the ten-foot walls of the betatron room would
5 be certainly more than adequate shielding.

6 If and even where there was not
7 well-shielded, there is enough scatter
8 radiation from that that would be absorbed
9 even by the thinner walls.

10 However, there was one incident,
11 and it could have been more. So we have to
12 say that it is a potential source of exposure
13 from incidents of improper use of it, just
14 like there were incidents, at least two
15 incidents that were cited, of workers, non-
16 betatron workers being exposed to the
17 betatron, being in the actual shooting room.
18 One of them was actually inside the casting
19 while it was being radiographed. And another
20 one had walked into the room somehow, and the
21 beam was on.

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1 So you get these -- that is where
2 the hazard is. The hazard is from that. And
3 the betatron, I know we are not talking about
4 the betatron but I am just using it as a
5 contrast, was relatively safe because you had
6 safety interlocks. If the operator
7 inadvertently stepped out of the control room,
8 his machine would shut off. And if the door
9 was open, you couldn't turn it on because you
10 had your interlocks.

11 There were no safety, because it
12 was a portable machine, there were no safety
13 interlocks on the machine. You had a key to
14 turn it on but nothing to stop somebody from
15 turning it on with other people or somebody
16 inadvertently walking into the room while the
17 machine was on.

18 Because again, I don't know how
19 long the exposures were but they were
20 probably, since the power are so low, they
21 were probably significant period of time that

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1 machine would be left on to expose the film.

2 CHAIRMAN ZIEMER: The particular
3 sort of accidental incident you are talking
4 about, that is the one that the workers
5 indicated that they knew from the sound that
6 it had been turned on and they exited the room
7 immediately.

8 DR. ANIGSTEIN: You may be right.
9 Yes, I think so. I mean, they exited or
10 screamed bloody murder and the guy shut it
11 off, something like that.

12 CHAIRMAN ZIEMER: Well, they were
13 aware.

14 DR. ANIGSTEIN: They were aware
15 because they were -- I mean, they were attuned
16 to it but maybe another worker would say, oh,
17 there is some noise.

18 CHAIRMAN ZIEMER: Well, I think
19 what I read, I don't know if it was in an
20 affidavit or what, but they indicated that
21 they left the room immediately because they

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1 knew.

2 DR. ANIGSTEIN: Yes, in that
3 incident.

4 CHAIRMAN ZIEMER: In that incident,
5 yes.

6 DR. ANIGSTEIN: In that particular
7 incident, right.

8 CHAIRMAN ZIEMER: Yes.

9 DR. ANIGSTEIN: But even with the
10 betatron, during the discussion, this came out
11 during one of the worker meetings, one of
12 somebody else, the one that the recently
13 deceased supervisor described the event and
14 somebody else said, well, didn't the alarms go
15 off? And he said, sure, the alarms were going
16 off and the guy just ignored them. Didn't
17 hear them, ignored them, whatever.

18 So it is a potential hazard. How
19 to assign an actual dose to that, I don't have
20 an opinion on. Obviously, we could do a
21 calculation, review the geometry and make some

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1 assumptions as to here is the machine, here is
2 the casting. Somebody is standing over there.
3 That is calculable. But how do you arrive at
4 what is the scenario?

5 That is always the problem. We
6 know how to do analyses. We don't know always
7 how to define scenarios.

8 CHAIRMAN ZIEMER: Okay. Any Board
9 Members have comments?

10 MEMBER MUNN: No, except that we
11 are talking about an extremely rare occurrence
12 here. So far as we know, probably a unique
13 one there.

14 CHAIRMAN ZIEMER: In that
15 particular --

16 MEMBER MUNN: On that particular
17 case.

18 CHAIRMAN ZIEMER: -- instance, yes.

19 MEMBER MUNN: And the number of
20 people who would have been involved would have
21 been -- certainly, an incident of that sort

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1 would show up on a CATI. That would be the
2 kind of story that would be taken home for
3 sure.

4 CHAIRMAN ZIEMER: I did want to ask
5 Bob, you had a discussion in your document and
6 it is sort of a preliminary discussion of
7 inter-use of rem/rad roentgen --

8 DR. ANIGSTEIN: Yes, well --

9 CHAIRMAN ZIEMER: Now let me finish
10 my question. Because we all know that in
11 radiation safety practice for radiation
12 protection purposes, in fact those terms are
13 used interchangeably. As a practical means,
14 when someone says mR per hour, are they really
15 talking about the exposure rate? In fact,
16 some of the badges used to be reported in mR,
17 if you look at the old records and so on.

18 And you pointed out cases where the
19 -- well, first of all, a roentgen only apply
20 to X and gamma.

21 DR. ANIGSTEIN: Right.

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1 CHAIRMAN ZIEMER: You pointed that
2 out and that is entirely correct.

3 And then secondly, cases where the
4 rem and the roentgen are not numerically
5 equal, they may differ by as much as -- well,
6 you give the table.

7 DR. ANIGSTEIN: I took the --
8 because in the dose reconstruction, we are
9 always having a summation of 30 to 250 keV to
10 assign a dose --

11 CHAIRMAN ZIEMER: Yes, but my
12 question --

13 DR. ANIGSTEIN: -- and over that
14 range, just --

15 CHAIRMAN ZIEMER: My question
16 though is, if we are not assigning dose from
17 the X-ray other than saying that it is a small
18 fraction of what they get from other things
19 and, therefore, we are not in a sense
20 correcting for it. That's correct.

21 Because if you look at the table,

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1 in the range of cobalt-60 and the higher
2 energies, the ratio is very close to one.

3 DR. ANIGSTEIN: Yes.

4 CHAIRMAN ZIEMER: And it is only
5 when you get down into, if you get down to --
6 well, these X-rays were what, 250, were they
7 250 kilovolts? In that range. When you get
8 down there, your correction factor is about 20
9 percent or something like that and it gets
10 greater at real low energy.

11 But you were sort of pointing this
12 out more from an academic point of view than -
13 - from a practical dose reconstruction point
14 of view, given the assumptions that are being
15 made, this is not an important correction as I
16 see it. It is conceptually important from a
17 purist standards point of view. But from a
18 practical point of view on dose
19 reconstruction, is this important? I'm just
20 asking because you have it in here.

21 DR. ANIGSTEIN: The OCAS-1 external

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1 exposure guide has different factors. This is
2 the organ dose conversion factor. You start
3 off with exposure. There is a different one
4 for personal dose equivalent. There is
5 another one for ambient dose equivalent. So
6 they make that distinction and it just seems -
7 -

8 CHAIRMAN ZIEMER: This is the depth
9 dose, I think. Right?

10 DR. ANIGSTEIN: Right. Well, this
11 is the HR10 with the ambient dose equivalent.
12 Deep dose isn't used anymore.

13 CHAIRMAN ZIEMER: All right, but I
14 mean, that is what we would call it.

15 DR. ANIGSTEIN: Right. I mean, I
16 just took that. I could have taken another
17 one.

18 CHAIRMAN ZIEMER: Right.

19 DR. ANIGSTEIN: And I am just
20 saying it doesn't seem to be that difficult to
21 do. mR to my mind, r stands for rem, for rem

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1 doses.

2 CHAIRMAN ZIEMER: Right.

3 DR. ANIGSTEIN: Whereas if you mean
4 milliroentgen, for instance all the GSI film
5 badges, Landauer film badges from the '60s are
6 in milliroentgen.

7 So it just seems to me that it is
8 not that onerous to keep it straight because
9 all the exposures we talk about here, the
10 limits were and are, as they say, mR per hour,
11 so why not just stick to them? You know,
12 maybe I'm being a purist. Maybe I am being a
13 pain in your bottom.

14 CHAIRMAN ZIEMER: Well, and see
15 actually when they roped off an area at 2 mR
16 or whatever it was, a practicing health
17 physicist would say we roped it off at 2
18 millirem per hour or they would say 2 mR per
19 hour. I mean, they would use it either way.
20 Most of those instruments are reading out in
21 milliroentgen per hour but the ionization

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1 chambers and the GMs, the only time --

2 Well, I was just trying to get a
3 feel for whether this issue is affecting
4 anything in your mind on the modeling. You're
5 just asking for consistency in how we --

6 DR. ANIGSTEIN: Yes, exactly.

7 CHAIRMAN ZIEMER: Yes, okay.

8 DR. ANIGSTEIN: Exactly. It's not
9 a showstopper.

10 MR. ALLEN: I just wanted to point
11 out, part of the reason we did this because
12 you get testimony, you get people talking.
13 And like you said, you get the millirems per
14 hour when --

15 CHAIRMAN ZIEMER: You have to leave
16 it the way they said it in testimony, number
17 one.

18 DR. ANIGSTEIN: Yes.

19 CHAIRMAN ZIEMER: And even in
20 records where they may record and call it
21 their body, their whole annual dose was in mR,

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1 you have to leave it there, yes.

2 MR. ALLEN: What I was going to
3 point out is the Landauer records were
4 reported in millirems but I believe the
5 calibration was done in an area without a
6 phantom type of method.

7 So really, unless they made the
8 correction, which we don't know for sure, it
9 is really roentgen.

10 DR. ANIGSTEIN: At one point they
11 started using an actual phantom to calibrate
12 the doses, you know using a phantom for that
13 scatter.

14 MR. ALLEN: Our general approach is
15 to use roentgen but you end up with a bigger
16 dose correction factor, unless we know it is
17 something calibrated to Hp10 rem.

18 CHAIRMAN ZIEMER: We just want
19 clarity on that.

20 Okay, let me ask for other comments
21 on portable X-rays and also Dr. McKeel or Mr.

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1 Ramspott and comments there for us.

2 DR. McKEEL: This is Dan McKeel.

3 CHAIRMAN ZIEMER: Yes.

4 DR. McKEEL: I do have a comment.

5 You know, I have listened to this discussion
6 and frankly I am very disappointed because the
7 point that I tried to make is, and John as
8 well, that the rule that we are citing is
9 OCAS-IG-003. And what that rule says is that
10 all doses must be calculated now. That is why
11 I brought up this morning that actually this
12 model is supposed to be included in a revised
13 Appendix BB that would apply to people not
14 only in the SEC for the partial doses, but it
15 would apply to all the people who have dose
16 reconstruction that are not in the SEC Class.

17 So our contention is, and I feel
18 very strongly about this, is that NIOSH's job,
19 not SC&A's job, NIOSH's job is to calculate as
20 accurate a dose as they can come up with. And
21 the real conclusion this morning is they

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1 haven't done that, and SC&A hasn't done that.

2 And to me, it is a simple: have you
3 followed the OCAS-IG-003 directive? And the
4 answer is no.

5 And so the question is, are you
6 going to do that? If you haven't done it,
7 then I am saying that NIOSH has not
8 demonstrated that it can calculate a dose that
9 satisfies that requirement and SC&A has not
10 really verified that model.

11 Also I want to point out that it
12 seems to me that you all are being extremely
13 arbitrary about whose information you accept,
14 and I'm talking about worker testimony now.
15 We will soon learn that a number of
16 radiographers testified that there was a large
17 80-curie cobalt source at GSI in use in 1963
18 and 1964, in that period. So far, neither
19 SC&A nor NIOSH has believed that information.

20 Now here -- I know the basis for
21 saying that the 250 kV portable machines,

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1 portable machines, were used infrequently and
2 were always used in the betatron building.
3 Well, I would like to suggest to you that
4 there is nobody alive who could actually
5 verify those statements because, you know,
6 individuals who worked there between '64 and
7 '66, they know what their own experience was
8 on one or two shifts a day, not working seven
9 days a week. They weren't there permanently.
10 They didn't follow those machines around.

11 And I think it is just bad science,
12 very bad science to say that you know that
13 those machines were used only in the betatron
14 buildings. You don't know that.

15 You don't know what those machines
16 were used for. You know, they were industrial
17 X-ray machines. And you don't know whether
18 those machines were calibrated.

19 In fact, you don't know anything
20 really about the use of those machines. And I
21 would suggest that yes, you can make up

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1 wildly, overly optimistic estimates for the
2 dose delivered by those two machines but you
3 know, it comes back to this test of
4 plausibility.

5 Now you might say, well, anything
6 that is in favor of the claimant is just fine.
7 But I would say that the spirit of that whole
8 thing is you need to, for dose reconstruction
9 purposes, yes, you can be overly optimistic on
10 the high side to give the claimants the
11 benefit of the doubt but on the other hand,
12 wildly using that kind of reasoning to support
13 wildly -- wild guesstimates is what I would
14 say, that is not okay.

15 So I would put this again, you
16 know, you must calculate those doses. NIOSH
17 must calculate them. It is not really up to
18 SC&A. Then SC&A needs to verify those
19 calculations and say yes, we agree, or no we
20 don't agree.

21 So that would be my comment. And I

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1 just think this has happened over and over and
2 over again and my feeling would be if you want
3 to say that a dose is bounding from the
4 betatron, then you cannot make the simple
5 assumption, simplistic assumption that those
6 doses are much higher.

7 And, you know, just to reinforce
8 why, among the reasons, that is not
9 necessarily true is those portable X-ray
10 machines -- there is other testimony. I can't
11 cite it chapter and verse right now because
12 this has been going on for six years, but
13 there is other testimony that those portable
14 X-ray machines -- many people have said we
15 have no idea where they were used. Until I
16 turned up those NRC FOIA records, there was
17 not a single person we ever talked to that
18 were even aware that there were two 250 kVp
19 portable machines that were, you know,
20 industrial use type machines at GSI. Not a
21 single person who is alive ever testified to

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1 that.

2 So they couldn't know very much
3 about those machines if they didn't know -- I
4 mean, many people would go into the old
5 betatron and the new betatron facility on a
6 daily basis. And if those machines were
7 always there sitting in the shooting room,
8 unless people were blind, they should have
9 realized that. And nobody ever testified
10 that.

11 So I am going to suggest that all
12 of these assumptions are just really created
13 almost out of air. And knowing what the tube
14 design factors were, without having
15 calibration data or anything like that, it is
16 just those machines -- I'm sure they leaked as
17 well. So whoever the operator was, they were
18 exposed to that leakage dose. You don't have
19 any figures like that.

20 So I don't know how to make that
21 point any stronger, but I wanted to make it

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1 this morning because I feel it is really
2 something that has been neglected. And you
3 simply cannot say that good science is being
4 used when you have not calculated a dose and
5 you say, oh, it is so small that we don't need
6 to calculate it because of the much larger
7 bounding doses from the betatron. I say, yes,
8 you do. And until you do, then you can't say
9 that this source has been dealt with.

10 Thank you.

11 CHAIRMAN ZIEMER: Yes, thanks, Dan.
12 Let me ask a couple of questions that grow out
13 of this. And I suppose part of this is and
14 you are suggesting that if this were an SEC
15 and someone had less than 250 days and
16 identified themselves as having worked with
17 the X-ray units, how would you reconstruct
18 that is kind of the question you are asking.
19 If we had no numbers and they thought that was
20 their only source of exposure, it appears that
21 currently they would be assigned a dose of one

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1 of the other doses, like the betatron dose.

2 But your point, I think, is that
3 that may cover it but you don't feel that is
4 an appropriate way to do it.

5 Also --

6 DR. McKEEL: I think it doesn't
7 fulfill the guidelines.

8 CHAIRMAN ZIEMER: Yes, I am just
9 clarifying the nature, I understand the point.

10 And then secondly, do we have any
11 information -- I mean, I had gathered from
12 what I had read in the documents that everyone
13 had kind of agreed they were only used in the
14 betatron rooms but you are suggesting that may
15 not have been the case. So I am going to ask
16 both SC&A and NIOSH. What do we know or what
17 can you respond to what has been said? Bob.

18 DR. ANIGSTEIN: Okay. Responding
19 to Dr. McKeel and I don't know if he said it
20 deliberately, you said "no living person."
21 That is in a literal sense correct because the

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1 person who had the most information passed
2 away, last November I think it was.

3 I interviewed that person. I have
4 a verbatim transcript in my record of that
5 interview. He said he and another plant
6 official whose name I don't remember right now
7 purchased those machines. They were used
8 infrequently. They were just basically used
9 to see that they worked. They were used quite
10 infrequently. They were used only -- both he
11 and the other worker who participated earlier
12 today, told me that they were used exclusively
13 in the betatron building, the new betatron,
14 and that the operator was in the control room
15 where there is, I believe, a six-foot thick
16 wall, which is to say that he got any dose
17 from one of the machines is nonsense.

18 CHAIRMAN ZIEMER: Yes.

19 DR. ANIGSTEIN: So the only sources
20 of exposure would be, as I mentioned earlier,
21 accidental turning on of the machine,

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1 triggering of the machine when there was some
2 other person in the room who was not involved
3 in the use of that machine.

4 CHAIRMAN ZIEMER: Bob, is it your
5 understanding that that covered the whole time
6 period from '64 through '73? Has knowledge of
7 these --

8 DR. ANIGSTEIN: Okay, this person
9 that gave me, the supervisor, the betatron
10 supervisor was promoted out of the non-
11 destructive testing department to another
12 higher job with different responsibility. So
13 at that point, his film badge records ended in
14 November of '64 and therefore he did not have
15 that same intimate knowledge. He remained in
16 the employ of GSI but did not have the records
17 --

18 CHAIRMAN ZIEMER: Through what
19 year, or do you remember?

20 DR. ANIGSTEIN: He remained in the
21 employ of GSI, I think, coincidentally through

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1 the end of the covered period. I think it was
2 middle, somewhere around June '66 or
3 thereabouts. '66. Definitely in '66.

4 CHAIRMAN ZIEMER: Okay.

5 DR. ANIGSTEIN: So therefore, there
6 are some, you know, Dr. McKeel has a point
7 that we don't know what they were, how they
8 were used. But I mentioned his name, he was
9 on the phone this morning, John Dutko told me
10 the same thing, that they were used in the
11 betatron room.

12 CHAIRMAN ZIEMER: Only.

13 DR. ANIGSTEIN: Well --

14 CHAIRMAN ZIEMER: And do we know at
15 least --

16 DR. ANIGSTEIN: And he started in
17 late, around the end of '63 or beginning of
18 '64. And he left the employment of GSI late
19 in '66.

20 DR. McKEEL: This is Dan McKeel
21 again. My rebuttal to that is both gentlemen

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1 that you mentioned, the supervisor who was
2 promoted and the person who talked to us this
3 morning, I have also talked to one of them
4 about this. You know, they were there part-
5 time. They did not stay there around the
6 clock. And if you ask them the question. for
7 example, what were those machines used for,
8 why were they purchased, what was the specific
9 project that they were used for, there is no
10 answer. And so I actually have interviewed
11 both of those gentlemen many more times,
12 dating back to 2006, than anybody else on the
13 phone today has done. And it is my opinion
14 that I don't believe that you should base your
15 opinions on just those two bits of testimony.

16 You are missing all of the
17 pertinent records. You don't have any shot
18 logs. You don't have any calibration records.
19 You know, we just don't have the information
20 that would support those statements. So I am
21 going to say that also this is getting into a

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1 logical bind. And the logical bind is: if you
2 choose to accept the testimony of those two
3 workers as the gospel truth, then soon we are
4 going to go on to the cobalt sources and I am
5 going to insist that you use the sworn
6 testimony, the affidavits of five GSI workers
7 from 2008 who swore that they used the large
8 cobalt-60 source in the 1963-64 time period,
9 irregardless of when the paperwork says that
10 source was first licensed, which was in 1968.

11 So you know, I think you have got
12 to be consistent in the way you use worker
13 testimony. And I think -- John Ramspott has
14 some other thoughts along those same lines.

15 But anyway, I simply don't think
16 that those two people -- and I will mention
17 this. This is not to be critical of anybody
18 living or not living but that supervisor that
19 Dr. Anigstein refers to who is a good friend
20 of ours, you know, he was not in either
21 betatron room all the time. I mean, he was

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1 not a practicing full-time radiographer. He
2 wasn't there on the night shift. He wasn't
3 there on the weekend shift. And even though
4 he may say they were not used for anything
5 except what was in the betatron room, I don't
6 think you will find any record of why were
7 they used in the betatron room.

8 You know, I just don't think you
9 can prove that other than by statements from
10 two individuals who weren't there more than 30
11 or 40 percent of the time that the machines
12 were used.

13 So couple that with the fact that
14 you have zero records, you would not know
15 about the second machine unless John Ramspott
16 had done his always diligent work and found
17 that there were two machines, two industrial,
18 two 250 kVp machines sold at auction in 1973
19 plus a third medical X-ray machine. And the
20 truth of the matter is, that auction
21 notification refers to the third machine as a

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1 medical machine. But the truth of the matter,
2 we don't know anything about how that machine
3 was used as well.

4 We don't even have any proof that
5 it was used as a medical machine. And even if
6 it was used as a medical machine, you know,
7 you all use an OTIB instead of actually
8 knowing how many X-rays were involved. And
9 I'm sure it wasn't just routine X-rays of the
10 chest when you reported for duty. But the
11 steel mill probably involved lots of
12 exposures, at least to the operator of the
13 machine and probably to the workers. We have
14 no idea whether that medical X-ray machine was
15 calibrated, how much it was used, what it was
16 used for. We don't have any of that
17 information. All we have is the fact that
18 there were three industrial X-ray machines,
19 one of which was used for medical purposes,
20 two for industrial purposes. Well, what does
21 that mean? So we don't know anything about

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1 them is what it comes down to. That is my
2 point.

3 CHAIRMAN ZIEMER: Okay, thanks.

4 DR. McKEEL: I guess that's all I
5 need to say, all I can say.

6 MR. RAMSPOTT: Dr. Ziemer?

7 CHAIRMAN ZIEMER: Yes.

8 MR. RAMSPOTT: This is John
9 Ramspott. May I make a comment?

10 CHAIRMAN ZIEMER: Please do, John.

11 MR. RAMSPOTT: As far as the X-ray
12 machines are concerned, the supervisor that
13 everybody is referencing, like Dan said, well-
14 respected, a friend of ours, a good person, he
15 didn't know about the second machine. He
16 never made a comment about buying that second
17 machine.

18 I'm sure Dr. Bob, Bob, have you
19 ever heard him talk about multiple X-ray
20 machines? I never heard it.

21 DR. ANIGSTEIN: I am going by my

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1 notes. He said he bought a -- he said he
2 bought the X-ray machine.

3 MR. RAMSPOTT: The X-ray machine.

4 DR. ANIGSTEIN: He never really
5 went, I never asked him point-blank were there
6 two machines.

7 MR. RAMSPOTT: I've never heard him
8 refer to more than one.

9 DR. ANIGSTEIN: I have a lot of
10 notes at home, that are handwritten so I don't
11 bring them with me, about my conversations
12 with this gentleman. And I can go back and
13 look and see. But my memory tells me maybe he
14 did. He may have mentioned more than one
15 machine. I don't remember.

16 MR. RAMSPOTT: Because I heard
17 other workers talk about them using them
18 wherever they had to on the plant but not in
19 any big detail. I can't give you any good
20 solid data on that. But he never did know
21 there were two at the site, with all the

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1 conversations I have had with Jim at all.

2 None. He told me about the one he bought.

3 As far as the safety of that
4 machine, apparently there were more than one
5 or two incidents. Because I am looking at a
6 photograph that I took from when I visited
7 inside the old betatron. We were given
8 permission to go on-site. And there is
9 actually a locked switch for the betatron,
10 like the guy said, and then you can see a new
11 switch. You can tell the conduit is newer.
12 It says X-ray. So they must have had enough
13 incidents that somebody decided they better
14 put some sort of lock on that. I never really
15 looked at this before but now I just enlarged
16 it. I always assumed it was for the betatron.
17 Well, it says X-ray on it. Well, actually it
18 is labeled: one is labeled X-ray and one is
19 labeled betatron. You can certainly tell
20 which one is the old one and which one is the
21 new one.

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1 So you are right. There may have
2 been other incidents, enough that they decided
3 to take a safety measure. Maybe a little
4 later.

5 CHAIRMAN ZIEMER: Okay, let me ask
6 you this, John. Do you know or maybe Bob, my
7 curiosity has been aroused a little bit on the
8 medical unit, has there been any worker
9 testimony indicating routine medical X-rays
10 during the course of work or has anyone ever
11 asked that question?

12 MR. RAMSPOTT: I have been told
13 that the guys would get them definitely when
14 they were laid off. You know, if they had to
15 come back. The dispensary over there, they
16 actually have got photographs of the doctor
17 and a nurse. They actually had a -.

18 CHAIRMAN ZIEMER: And they did X-
19 rays there?

20 MR. RAMSPOTT: Oh, absolutely.
21 Sure.

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1 CHAIRMAN ZIEMER: So that would be
2 the likely location of this unit or has
3 anybody tied that in? Is there any
4 establishment or Dave, would you have --

5 MR. ALLEN: I think the auction
6 record had dispensary written on the top of
7 that.

8 MR. RAMSPOTT: I think it might
9 have, too, Dave.

10 CHAIRMAN ZIEMER: So there is a
11 likelihood that was in the medical facility.

12 MR. RAMSPOTT: Their medical
13 facility. And I don't think it had anything
14 to do with chest X-rays. They may have taken
15 one when you came back.

16 There were a lot of lay-offs in
17 that business for a long time. They would get
18 laid off and if they were laid off and they
19 got called back, they got an X-ray. It was a
20 standard procedure which the workers could
21 probably verify that better than I can.

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1 CHAIRMAN ZIEMER: I got you but --

2 DR. McKEEL: This is Dan McKeel.

3 CHAIRMAN ZIEMER: Yes, Dan?

4 DR. McKEEL: A dispensary in a
5 steel plant, if you --

6 MR. RAMSPOTT: It's like a MASH
7 hospital.

8 DR. McKEEL: -- if you think about
9 it, right, the X-rays are going to be people
10 with mashed fingers, people with mashed hands.

11 MR. RAMSPOTT: Steel splinters,
12 absolutely.

13 CHAIRMAN ZIEMER: Yes.

14 DR. McKEEL: Yes, all sorts of
15 things.

16 CHAIRMAN ZIEMER: Okay.

17 DR. McKEEL: There was a machine
18 over there called a rotoblaster and we know
19 one person at Dow who got killed in the
20 rotoblaster and got his body parts spread all
21 over the plant.

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1 So you know, there were injuries
2 galore, I am sure. You did not have the
3 medical dispensary records. We don't either.
4 They were all torn up and lost apparently.
5 But we don't have that information. There
6 could have been and probably dozens of X-rays
7 taken each month to justify that machine and
8 having a doctor and a nurse on-site. I mean,
9 GSI didn't spend a lot of extra money on
10 amenities but they did employ those people
11 because they just had to do that.

12 So we don't know anything about
13 that machine. So simply writing it off and
14 not considering it at all is not okay.

15 CHAIRMAN ZIEMER: I want to ask
16 this.

17 DR. McKEEL: Not scientifically
18 okay.

19 CHAIRMAN ZIEMER: Thanks, Dan. I
20 want to ask this question and maybe I will
21 pose it first to Jim Neton.

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1 So it would appear, at least
2 superficially, that this medical X-ray may not
3 have been used for routine chest X-rays in the
4 sense that we do it at the other facilities.
5 It might have been there to check for
6 splinters and wounds and other injuries that
7 occurred in the plant.

8 In the dose reconstruction program,
9 are those considered -- if they are not
10 considered medical X-rays as a condition of
11 employment but they are done as medical X-rays
12 for worker injury, are they included in this
13 program? You may not even know the answer to
14 that. I don't know if we have had this
15 before.

16 DR. NETON: No. I can say that
17 diagnostic X-rays are not considered part of
18 the exposure for this program. Only medical
19 X-rays that were taken as a condition of
20 employment that worked with radioactive
21 materials.

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1 DR. ANIGSTEIN: If it were
2 medically necessary, they would not be
3 inclusive.

4 CHAIRMAN ZIEMER: Okay. What I am
5 trying to get at is, if this was in the
6 dispensary and it is used for medical
7 diagnosis, then it cannot be included by law.

8 MR. RAMSPOTT: Paul, they used it
9 for both over there. They were checking these
10 guys because of the dust, too. You know, that
11 would be -- when you would come in for an X-
12 ray site, aren't they -- what do you take an
13 X-ray for at Mallinckrodt?

14 CHAIRMAN ZIEMER: Okay, I think we
15 are distinguishing between a medical X-ray and
16 an X-ray required as a condition of
17 employment, which is not diagnostic. It is
18 not based on a pre-existing condition.

19 MR. RAMSPOTT: I think they had
20 both. In order to be re-employed after they
21 were laid off, they had to get an X-ray. What

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1 were they looking for?

2 CHAIRMAN ZIEMER: Okay.

3 DR. ANIGSTEIN: But that is already
4 included. All dose reconstructions for GSI
5 workers assume annual X-rays.

6 CHAIRMAN ZIEMER: Annual X-rays,
7 they are not actually doing annual X-rays but
8 you are assigning them.

9 DR. ANIGSTEIN: Exactly right.
10 Exactly right. They are assigned that.
11 Unless we --

12 CHAIRMAN ZIEMER: Unless you know --

13 -

14 DR. ANIGSTEIN: -- otherwise that
15 is NIOSH policy.

16 CHAIRMAN ZIEMER: Yes.

17 DR. ANIGSTEIN: So this business
18 about workers being hired and laid off and re-
19 hired, unless this happens several times a
20 year, I would think that the annual X-ray
21 would encompass that.

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1 But the annual X-ray also includes

2 --

3 MR. RAMSPOTT: Unless the workers
4 could tell us what that frequency was, I don't
5 know.

6 CHAIRMAN ZIEMER: So that was --
7 but as you are stating, that was only required
8 if they were coming back to work after being
9 laid off?

10 MR. RAMSPOTT: Yes, Paul. There
11 would be layoffs. That's what they told me.
12 If they came back, they had to be checked.

13 Now, I have never asked anybody did
14 you get at least one a year, I never asked the
15 question.

16 CHAIRMAN ZIEMER: What about when
17 people started work, if they hadn't been laid
18 off, just new workers, did they have to have
19 an X-ray?

20 MR. RAMSPOTT: Good question. We
21 could ask some of the workers. Bob knows some

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1 of them. He could ask them.

2 MEMBER MUNN: In any case, if they
3 are being given credit for an annual exposure
4 for an X-ray as a condition of employment,
5 they would be covered for that.

6 DR. NETON: It is pretty clear
7 under Section 2.3 of IG-003 specifically
8 describes what we just said, screening X-rays
9 as a condition of employment are covered but
10 diagnostic or therapeutic X-rays are not.

11 CHAIRMAN ZIEMER: I don't know what
12 an X-ray for returning for work, would that be
13 considered diagnostic? It is sort of a
14 condition of employment.

15 DR. NETON: I would think that
16 would be a pre-employment.

17 CHAIRMAN ZIEMER: That would be
18 covered.

19 MR. ALLEN: I think we assigned
20 pre-employment, annual, and termination.

21 CHAIRMAN ZIEMER: Okay.

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1 MEMBER MUNN: Which would certainly
2 cover any of the conditions we have discussed
3 here.

4 CHAIRMAN ZIEMER: Right. And then

5 --

6 DR. ANIGSTEIN: Also, I'm just
7 looking at that auction notice and the medical
8 X-ray unit is specifically listed under the
9 heading of dispensary. They list all the
10 dispensary equipment like resuscitator,
11 sterilizer, water bath. And so the location
12 of it or the category of it by the auctioneers
13 is certainly dispensary equipment. Whereas,
14 the industrial X-ray machines are listed under
15 darkroom and camera equipment.

16 CHAIRMAN ZIEMER: Right. Then the
17 only other question I think Dr. McKeel's
18 question had to do with the output of the
19 machine and the specifications and the
20 calibration. And NIOSH has some sort of
21 standard ways. We know the model of this.

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1 DR. ANIGSTEIN: We know the model.
2 In one case, the Andrex unit on the auction
3 notice it lists the kV and the mA, 250 kV 8
4 mA. The GE, they just give the model number
5 and we have been able to find both --

6 CHAIRMAN ZIEMER: That actually
7 sounds almost like a fluoroscopic unit.

8 MR. ALLEN: That's the industrial
9 X-ray.

10 DR. ANIGSTEIN: The 250 -- no. I'm
11 talking about the industrial machine.

12 CHAIRMAN ZIEMER: Oh, no, but the
13 medical.

14 DR. ANIGSTEIN: The medical just
15 says, doesn't get the whole thing. It says
16 200 mA Autoflex post-style, table side. I
17 didn't go any further into this so I am just
18 looking at it as if it were the first time
19 because I didn't really think it was
20 significant.

21 It says 200 mA Autoflex post-style,

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1 serial number, model number, table style --

2 CHAIRMAN ZIEMER: Well, if we have
3 all that information, you can easily determine
4 if it fits into your standard way of
5 calculating chest X-rays. Right, Jim?

6 DR. NETON: There are techniques
7 that would be used to calculate the output,
8 dose output of that X-ray machine.

9 CHAIRMAN ZIEMER: I mean, when you
10 assign medical exposures you can do that by --

11 DR. NETON: Right. Just by
12 milliamp settings.

13 CHAIRMAN ZIEMER: Milliamp
14 settings.

15 DR. MAURO: Right now you go to the
16 OTIB-6 standard lookup tables. And the
17 question is: does this particular unit fall
18 within the envelope? I know we reviewed OTIB-
19 6. We found that they didn't count favorably.

20 I guess the reasonable question is,
21 does this particular unit fall within the

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1 envelope as defined in OTIB-6? And have it as
2 a function of time for different time periods.

3 CHAIRMAN ZIEMER: Well, that would
4 be fairly easy to check out. But it appears
5 to me that this unit, at least I feel fairly
6 confident that we know where it was used, we
7 know that any diagnostic use to check wounds
8 and so on we cannot count anyway. So we don't
9 have to reconstruct that. And the only thing
10 you have to reconstruct are the chest X-rays
11 used for re-employment.

12 And right now you are already
13 assigning those annually, whether you know
14 whether the person actually got re-employed or
15 not, in the absence of knowing that, and
16 assuming that they had that experience, we
17 assigned it to them.

18 But I think that is where we are.
19 Dan, I would be glad to get any further
20 comments from you on that.

21 DR. McKEEL: No, that's fine. I

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1 just think that all of that is very good
2 reasoning and information that needs to be
3 taken care of.

4 CHAIRMAN ZIEMER: I just want to
5 make sure we cover it.

6 DR. McKEEL: However, with the doses
7 from the two industrial --

8 CHAIRMAN ZIEMER: Right.

9 DR. McKEEL: Yes, okay.

10 CHAIRMAN ZIEMER: And then on the
11 industrial ones now, and I am trying to sort
12 of keep track of if there is things that we
13 can do to follow up or whether we think we
14 have everything that we need to have on those
15 industrial ones. It seemed the question that
16 has been raised really is: were they ever used
17 outside of that facility in other areas? That
18 was part of it.

19 And I guess the other question that
20 arises is: to what extent was there
21 restriction of the exposures? It's sort of

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1 similar to the other radiography units.

2 I don't know if we will have any
3 more information other than what we have. We
4 have the information from the individual there
5 who has been indicated it was not necessarily
6 there all the time. He has at least testified
7 to what they knew about and that is what we
8 have.

9 DR. ANIGSTEIN: Well, that is true
10 for any information --

11 CHAIRMAN ZIEMER: Right.

12 DR. ANIGSTEIN: -- from anyone. No
13 one person was there 365 days 24/7.

14 CHAIRMAN ZIEMER: Right.

15 DR. ANIGSTEIN: So if you rule that
16 out, you rule out everything.

17 CHAIRMAN ZIEMER: Well, I'm not
18 ruling that out.

19 DR. ANIGSTEIN: I know it. But --

20 CHAIRMAN ZIEMER: I am sort of
21 saying: is there any other information that

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1 can be gained on those or do we have as much
2 information as we can get on those X-rays? Do
3 we know --

4 We know the models. We pretty well
5 know what their capability was, based on their
6 kVp and their milliamp capabilities.

7 Like any X-ray, you can establish
8 outputs and dose rates at different locations
9 from the target.

10 DR. NETON: These were used in an
11 area where we have film badges data though.
12 Right?

13 MR. ALLEN: Yes, the one he said
14 they bought, he was not even sure if they shot
15 the qualifying blocks. But he said it didn't,
16 in one meeting he said it didn't work for what
17 they wanted it to. So it was never really
18 used.

19 DR. NETON: Right. But even if
20 they used it, wouldn't the film badges that
21 were worn by the workers capture this?

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1 MEMBER MUNN: Of course.

2 MR. ALLEN: Yes, in the betatron,
3 yes. But he is the one that said it was a
4 portable unit. The other guy said the
5 controls were actually mounted in the control
6 room of the betatron, which it is no longer
7 portable, I would think, in that situation.

8 So in both situations, it seems
9 like it was only used in the betatron
10 building. The thing that is consistent is
11 nobody is saying how or why it was used or
12 where it was used because the consistent part
13 seems to be that it wasn't used very often if
14 at all.

15 DR. ANIGSTEIN: Just from a
16 knowledge of physics, you would use them for
17 very light castings, because if you are
18 talking about 250 kVps, the average photons
19 would be about a hundred -- you know, below
20 200. And you might want that to give more
21 detail. The cobalt may be penetrating.

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1 They are probably comparable to the
2 even lower energy, less penetrating than the
3 iridium, where they said they didn't like the
4 iridium because they were getting too much
5 information.

6 CHAIRMAN ZIEMER: Yes. They said
7 they found more flaws than they wanted. But
8 yes, that is quite right.

9 And the effective energy of these,
10 I mean, they are 250 kVp but the effective
11 energy is much lower, they are 80 to 100, in
12 that range. So they are not very penetrating.

13 Okay, well, that is what we have on
14 the X-rays. I think we need to move on to the
15 cobalt-60.

16 DR. McKEEL: Paul, this is Dan
17 McKeel.

18 CHAIRMAN ZIEMER: Yes, Dan?

19 DR. McKEEL: Could you make a
20 statement, please? I am confused. At the end
21 of this conversation, do you feel that NIOSH

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1 needs to be compliant with IG-003 and
2 calculate a dose for the two X-ray industrial
3 machines? Yes or no?

4 CHAIRMAN ZIEMER: I'm going to
5 defer to NIOSH in terms of what the
6 regulations say. They do have to account for
7 the doses. And there are many cases where
8 that is done through bounding as opposed to --
9 I mean, under the regulation they can do
10 bounding doses. So that, if they are able to
11 demonstrate that they can bound these as
12 opposed to calculating an exact number. But I
13 defer to Jim to tell us what the regulation
14 allows them to do in terms of accounting for
15 doses.

16 DR. McKEEL: And for dose
17 reconstruction, I wish you would, I understand
18 the bounding dose for the SEC but for dose
19 reconstruction and again in an Appendix BB
20 model, it would be okay to simply be able to
21 bound it from another source and still comply

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1 with --

2 CHAIRMAN ZIEMER: I believe we have
3 many dose reconstructions to individuals that
4 are based on bounding values. But let's ask
5 Jim to explain this.

6 DR. NETON: I believe if we could
7 put a plausible -- an upper bound under
8 plausible circumstances to a worker in that
9 situation that would consider those sources,
10 then when we bound we have reconstructed the
11 dose.

12 A person can't operate both
13 machines simultaneously. We would make the
14 claimant-favorable assumption that the person
15 was operating the machine that gave the higher
16 dose.

17 DR. McKEEL: But do you think that
18 the White Paper as it now stands gives you a
19 bounding dose for the two industrial X-ray
20 machines? Because I don't. So could you tell
21 me why you think it does?

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1 DR. NETON: Well, I think that
2 under the conditions at least that are
3 outlined in Dave's White Paper, it is bounded
4 if they were used in the betatron building.

5 DR. McKEEL: Because the betatrons
6 have a higher dose.

7 DR. NETON: No, no, no.

8 DR. McKEEL: No.

9 DR. NETON: Well, the betatrons or
10 is it the other source?

11 MR. ALLEN: That's true. It is not
12 in this particular White Paper. It will be
13 when it is all combined.

14 DR. NETON: Right.

15 MR. ALLEN: But also it is in the
16 betatron building in the film badge era.

17 DR. NETON: Right. You have the
18 film badge era there where people were wearing
19 film badges. We have records of exposure in
20 that time frame.

21 DR. McKEEL: Even though you

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1 understand about the film badges that their
2 applicability has been -- I mean, you have to
3 make a lot of assumptions. You are asserting
4 that the portable sources were used only in
5 the betatron building and that the only people
6 exposed to those machines were people who wore
7 film badges and that you have all the film
8 badges and so forth.

9 So that is what you are saying. So
10 that a film badge, a GSI film badge with
11 standard dental film now, which we will get
12 into, I hope, before this is all over, in more
13 detail, the standard dental film badges
14 without a filter are adequate to measure
15 accurately the doses received knowing that
16 that film badge, that film is very insensitive
17 to a very high MeV betatron.

18 So you would make that claim that
19 those film badges are perfectly accurate for
20 that purposes?

21 DR. NETON: I believe the film

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1 badge is accurate for measuring those
2 exposures. That is true. I don't think that
3 they are insensitive at the energies that we
4 are discussing.

5 DR. McKEEL: Well, we put on the
6 record from [Identifying Information
7 Redacted], who was with the engineering school
8 at Milwaukee School of Engineering, that they
9 were highly insensitive to those --

10 DR. NETON: I don't think he said
11 that, Dr. McKeel. I think he said they could
12 be. He didn't really know. I don't think he
13 made a determinative statement.

14 DR. McKEEL: Well, I read his
15 testimony --

16 DR. NETON: I just read it
17 yesterday. I mean, I could read it to you but
18 I don't recall that he actually definitively
19 provided any evidence that they were
20 insensitive. He said they could be.

21 DR. McKEEL: Okay. I asked you all

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1 a long time ago, it was an agenda item on this
2 Work Group, to discuss that particular issue
3 and it got bypassed, and it has never been
4 adequately addressed.

5 DR. NETON: Right.

6 DR. McKEEL: He said, [Identifying
7 Information Redacted] said, and he is not the
8 only one, there is a lot of information about
9 that, that those photons with an energy of
10 greater than one MeV up to 24 or 25 MeV, that
11 they would pass through that film and be
12 basically unrecorded.

13 DR. NETON: Well, he conjectured
14 that. He didn't provide any evidence of why
15 that would be true.

16 DR. McKEEL: But it is not really
17 his job to provide that evidence.

18 DR. NETON: Well, you are citing
19 him as a credible witness.

20 CHAIRMAN ZIEMER: Well --

21 DR. McKEEL: It is NIOSH's job to

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1 provide proof if you have it.

2 DR. NETON: And we will.

3 CHAIRMAN ZIEMER: Well, let me just
4 make a comment here. A 25 MeV photon, yes, it
5 will pass through a lot of material, as it
6 will, most of them will also pass through the
7 human body without interacting. But some will
8 and some will interact with the film badge and
9 you will get a response.

10 The other thing on the betatron is
11 that the exposures, for example people in the
12 control room, and outside of a case where
13 somebody is in with the betatron, you
14 primarily have photons that are scattered from
15 the casting and those are much lower energies.
16 The scattered photons are not at 25 MeV. They
17 are much lower.

18 DR. NETON: Remember, the maximum
19 energy is 25.

20 CHAIRMAN ZIEMER: Right.

21 DR. NETON: And so the average

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1 energy of the un-scattered beam is somewhere
2 around ten.

3 CHAIRMAN ZIEMER: Yes, this is a
4 bremsstrahlung spectrum.

5 DR. ANIGSTEIN: Well, not for very
6 high energy.

7 DR. McKEEL: Well, understand this.
8 There was data, Allis-Chalmers when they
9 installed a betatron, we learned this from
10 [Identifying Information Redacted], the
11 contracted expert from Allis-Chalmers and so
12 forth, we learned that when Allis-Chalmers
13 installed a betatron, they routinely did a
14 survey of the entire facility inside and
15 outside to document what sort of photon
16 fluxes, and I'm not sure whether they did
17 neutron fluxes but they certainly did photon
18 fluxes, what they were at various parts of the
19 building, the control room, and so forth.
20 Unfortunately, that data is lost.

21 So what we have actually is models

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1 that wildly disagree -- models, excuse me, by
2 SC&A and by NIOSH which disagree with each
3 other and certainly by an order of magnitude
4 at least disagree with the film badge.

5 And so their models, and of great
6 interest to me at least was this anomalous
7 conclusion from the SC&A model. I believe,
8 Dr. Anigstein can correct me, that they got
9 some of their highest readings from the models
10 in the control room. And I've always thought
11 that was an interesting and provocative
12 finding that needs to be followed up.

13 So, you know, I just don't think
14 you have a lot of that data about what kind of
15 exposures you would get within those rooms.
16 And I'll just let it go at that. I don't
17 think we have the data.

18 CHAIRMAN ZIEMER: Well, we may
19 actually need to come back to the film badges
20 and make sure we put all the issues to rest.

21 For example, I don't believe these

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1 were unfiltered dental films, number one. The
2 film used by Landauer was similar to dental
3 film but it was specifically dosimetry film,
4 number one. Number two, I'm not aware that
5 Landauer ever had unfiltered badges. I used
6 Landauer badges from the time they first
7 became a company and they always had a minimum
8 of two and usually four filters so that they
9 could distinguish low energy, high energy, and
10 betas.

11 So I don't think that individual's
12 conjecture that these were unfiltered dental
13 films --

14 DR. McKEEL: Well, there is a
15 worker who says he has his badge and we
16 believe that badge is unfiltered. And I have
17 heard that from several of the workers. Maybe
18 John Ramspott, he supports that idea, maybe he
19 can --

20 CHAIRMAN ZIEMER: Well, you can't,
21 you couldn't usually see those filters. They

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1 are embedded in plastic.

2 DR. ANIGSTEIN: Right.

3 MR. RAMSPOTT: Paul, we are
4 actually trying to get that badge from the
5 worker. He has identified it, he saw a
6 picture of a Landauer badge, it is on the ORAU
7 website, he identified it as the red Landauer
8 badge using dental film packets that you can
9 take in and out.

10 And if we can get his badge, we are
11 trying to get it from him. He is a little
12 tightfisted on that. If I get the badge, I
13 will be glad to share the information.

14 My intent is actually to take it
15 and have it X-rayed to see if there is
16 anything in it. The film is still in this
17 badge.

18 CHAIRMAN ZIEMER: Well, that would
19 be fine. I think probably I still have one of
20 my red Landauer film badge holders.

21 DR. ANIGSTEIN: We can say, an

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1 associate working for SC&A, Joseph Zlotnicki,
2 who was formerly a vice president for a number
3 of years for Landauer, categorically said all
4 the Landauer films always had filters, metal
5 filters, three metal filters --

6 CHAIRMAN ZIEMER: Plus an open
7 window.

8 DR. ANIGSTEIN: As Dr. Poston
9 pointed out, that means you really had four,
10 because you had just a simple plastic
11 filtration from that.

12 And they cannot see it because, as
13 I said, you would have to break it. And I
14 even suggested to John Ramspott maybe, I mean
15 I was sort of -- well, no, I was sort of half
16 serious -- take it to some medical X-ray
17 facility and just take a radiograph of it. It
18 will tell you immediately. You will see the
19 filters.

20 MR. RAMSPOTT: I've already got
21 somebody lined up to do the X-ray if I can get

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1 the badge.

2 CHAIRMAN ZIEMER: Jim has a
3 comment.

4 DR. NETON: I was just going to
5 say, I do apologize if the analysis that we
6 had put together for the efficiency of the
7 film as a function of energy didn't get to the
8 Working Group. We had done that. I didn't
9 have time to have it finalized in time for
10 this meeting but we can do that.

11 And our analysis has shown that not
12 only are they equally sensitive, they probably
13 overrespond up to 10 MeV, primarily because
14 pair production starts to dominate in that
15 region and you start getting more deposition
16 of energy from the pair production process.
17 But we will be sure to have that in time for
18 the next meeting.

19 CHAIRMAN ZIEMER: Okay.

20 MR. DUTKO: Dr. Ziemer?

21 CHAIRMAN ZIEMER: Yes.

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1 MR. DUTKO: Can I ask you a
2 question?

3 CHAIRMAN ZIEMER: Sure.

4 MR. DUTKO: Mr. Schutz reported
5 that when a betatron was off, it was measured
6 to accommodate -- is that not true?

7 CHAIRMAN ZIEMER: We understand
8 that there was -- well, two things. One, that
9 there was some short-lived activity
10 immediately after the betatron was turned off.
11 And this was measured, I think, lasting about
12 15 minutes. That is number one.

13 Number two, we know that there is
14 activation of both the castings and betatron
15 parts. So, that is another source. And when
16 we get to the betatrons, we will be talking
17 about that in more detail.

18 MR. DUTKO: Well, my point that I'd
19 like to make is: we were shooting sharp shots,
20 which is 90 percent of our work, we are in
21 that shooting room 11 or 12 minutes at least

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1 32 times a day.

2 Now our back is not to the cone all
3 the time. Why, sir, isn't the film badges
4 recording something? There is nothing shown
5 on these film badges and I don't know why in
6 the world somebody hasn't questioned that.

7 CHAIRMAN ZIEMER: Well, there are
8 two parts --

9 MR. DUTKO: If that is the case,
10 sir, there is an awful lot of contamination
11 that is not being measured.

12 CHAIRMAN ZIEMER: Well, number one,
13 contamination is not measured by film badges,
14 only the direct radiation is.

15 MR. DUTKO: Well, sir, you know
16 what I am talking about.

17 CHAIRMAN ZIEMER: Yes. The other
18 thing is, for example, if there is a field of
19 a few mR, I forget what the level was that he
20 had measured --

21 DR. ANIGSTEIN: He said there was

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1 15 mR per hour --

2 CHAIRMAN ZIEMER: -- 15 mR per hour

3 --

4 DR. ANIGSTEIN: -- at the moment of
5 shutoff. And then it went to zero in 15
6 minutes.

7 CHAIRMAN ZIEMER: Right. And a
8 typical film badge, and I don't know what
9 length of shot he had there, but for short
10 shots like he is discussing here, the
11 activation would be much less. I mean, you
12 don't have activation time.

13 MR. DUTKO: There was a fix for it
14 in '93, I believe, 1993 is when that
15 deficiency was fixed. There is an awful lot
16 of time between early '60s and '93.

17 CHAIRMAN ZIEMER: Right. Well, in
18 any event, those dose rates fell off very
19 rapidly. And even if you were in there very
20 quickly after a short shot, your dose may not
21 have been enough to exceed the threshold of

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1 detection which was --

2 MR. DUTKO: May or may not.

3 DR. ANIGSTEIN: Also, let's make
4 the observation. It is a little delicate but
5 I am going to try to call a spade a spade.

6 We got this information from the
7 former -- well, he was a NIOSH contractor,
8 Jack Schutz, who related from memory one
9 measurement he had made decades earlier. He
10 did not have any records of it in his
11 notebooks or anywhere else.

12 And so we are just saying -- and we
13 could not -- we stood on our heads and we
14 could not figure out any physical explanation
15 for that phenomenon.

16 CHAIRMAN ZIEMER: But nonetheless,
17 NIOSH is still --

18 DR. ANIGSTEIN: Yes, we are using
19 it --

20 CHAIRMAN ZIEMER: -- is still using
21 the value.

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1 DR. ANIGSTEIN: Yes. We are using
2 it because, and I am not disputing it, we are
3 using it because to be claimant-favorable we
4 have to assume it. But the fact that it
5 wasn't registered on a film badge could simply
6 mean it really wasn't there but we are giving
7 the workers credit for it anyway.

8 MR. DUTKO: Was Dr. Bob's
9 conclusion based on that?

10 DR. ANIGSTEIN: I'm saying that the
11 fact that the film badges did not show this
12 radiation and the model could not reproduce
13 it, no matter what we did to the model, makes
14 me wonder, well, we have three pieces of
15 evidence. One is, actually it says account,
16 recollection on the one hand. On the other
17 hand we have our model which doesn't show it.
18 Now that doesn't mean that the model is
19 perfect. And third, the film badges do not
20 show it.

21 The film badges aren't perfect

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1 either, but it is becoming a little difficult
2 to understand how that radiation got there.
3 One possibility, which I raised in one of my
4 reports, is, well, perhaps the worker, the
5 betatron operator had his back to the machine
6 and the radiation was so low-penetrating that
7 he, his body got exposed but it never hit his
8 film badge, which was in front.

9 But on the other hand, to assume
10 that he always had his back to the machine and
11 never faced it, that is also getting a little
12 less plausible.

13 MR. DUTKO: My question is this,
14 Dr. Bob. If your findings included this
15 leakage, these computations, why would it be
16 refused by NIOSH and not accepted?

17 CHAIRMAN ZIEMER: Refused by NIOSH?

18 MR. ALLEN: The current NIOSH model
19 has this dose in it.

20 DR. ANIGSTEIN: Yes, it does.

21 CHAIRMAN ZIEMER: Yes, NIOSH is

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1 adding that in.

2 MR. ALLEN: No, it's already there.

3 It's in the original.

4 DR. ANIGSTEIN: Yes, both NIOSH and
5 SC&A use it. We make slightly different
6 assumptions as to how to calculate the actual
7 dose from it, but we both, we have slightly
8 different positions, but we both accept it,
9 Jack Schutz's testimony even though we do not
10 have a physical explanation.

11 We even went as far as engaging an
12 accelerator specialist who tried to figure out
13 some mechanism within the betatron that would
14 continue radiating after it was shut off. We
15 could not find one.

16 MR. DUTKO: Could I quickly make
17 one more point, Dr. Ziemer?

18 CHAIRMAN ZIEMER: Sure.

19 MR. DUTKO: Thank you, sir. You
20 know, when we were in magnaflux, we had no
21 film badges on. Like it or not, that was the

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1 really the way it was.

2 When we are in magnaflux, we are
3 working side-by-side with chippers, grinders,
4 welders, burners, who have had had the same
5 cancers that we have had, that have been
6 compensated and we haven't. We were out there
7 with these people without a film badge on,
8 without known doses that they evidently got
9 and they are being compensated and we are not.
10 That is a little hard to understand.

11 CHAIRMAN ZIEMER: Okay, I don't
12 know the answer to that.

13 DR. NETON: Well, I don't know
14 about magnaflux but that is not a radiation
15 exposure, is it?

16 MR. ALLEN: No.

17 MR. DUTKO: What's that, sir?

18 MR. ALLEN: He's saying he was
19 side-by-side with some other workers that did
20 get compensated and somebody didn't. And that
21 is --

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1 MR. DUTKO: Well, we worked side-
2 by-side with chippers, grinders, welders, and
3 burners, in magnaflux, directly side-by-side
4 with these same people that have been
5 compensated because they have more time than
6 we have and we have the same cancers.

7 Something is a little hard to
8 understand here.

9 DR. NETON: Well, in general who
10 gets compensated, a lot has to do with the
11 type of cancer and the duration of the cancer
12 and the agent which the cancer developed.
13 There is a lot of parameters involved.

14 MR. DUTKO: There has been
15 radiographers with lung cancer refused, one
16 with bone cancer, and I could name names.
17 There is no rhyme or reason or sensibility
18 about the whole doggone thing.

19 DR. NETON: Well, all I can say
20 there is a lot of factors that go into the
21 calculation.

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1 MR. DUTKO: I understand, sir. I
2 am not trying to berate you. I am trying to
3 point these things out.

4 DR. NETON: Sure. Okay.

5 CHAIRMAN ZIEMER: Thanks. Let me
6 ask now are we ready to go on to cobalt-60? I
7 think we are.

8 Let's take a look. Now on the
9 cobalt-60, there is a couple parts to this.
10 There may be more than a couple. We
11 definitely have the two portable sources, the
12 260 and 281 sources that were purchased in May
13 of '62.

14 We have the 80-curie source that
15 was purchased in '68. There is still the
16 question about the presence of that source or
17 one like it earlier than '68 and we certainly
18 want to discuss that as well. But as a
19 minimum, we have those three cobalt sources
20 and possibly St. Louis Testing, I think,
21 through that period, too, if that's correct, -

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1 -

2 MR. ALLEN: That time period, yes.

3 CHAIRMAN ZIEMER: -- with a 10-
4 curie source. But we have already talked
5 about the St. Louis Testing separately.

6 So the focus of the model is on
7 those three sources, the two smaller cobalts
8 and the 80-curie. And those sources were
9 present from '64 -- well, the two little ones
10 at least, from '64 on till plant closure which
11 was a couple years into the operational period
12 and then into the residual period.

13 The large cobalt source under the
14 NIOSH model doesn't appear until '68. So it
15 is only there during the residual period, not
16 during the operational period. And then the -
17 - well, separately we can talk about what
18 about its appearance earlier.

19 So, Dave, you want to kick this off
20 and make any comments you want on that model?

21 MR. ALLEN: Well, I can give you an

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1 outline of how the two smaller cobalt sources
2 are modeled. As far as the 80-curie, and you
3 said the NRC records indicated they purchased
4 it in 1968, so we didn't model that. It was
5 outside the covered period.

6 As far as the smaller ones, it is
7 somewhat similar to the radium except there
8 are two -- we assume there was a radiography
9 room in Building 6 that it was used in. And
10 based on the reports we heard in previous Work
11 Group meetings, we also assumed at least
12 sometimes they moved it outside of that
13 radiography room into the areas.

14 So we got an estimate for when they
15 are shooting outside of that radiography room,
16 and a separate estimate for when they are
17 shooting inside this radiography room that is
18 inside the plant -- or Building 6.

19 As far as inside Building 6, the
20 shooting room inside Building 6, it is based
21 on a survey they did for the AEC with the

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1 sources exposed. And we simply took the
2 highest reading outside the room and the
3 highest one inside the room. There is a
4 little operator area inside that room behind
5 some armored plating. And if I recall this
6 right, we took the highest reading one meter
7 above the floor and used the 30 percent
8 utilization, 144 hours per eight-hour shift
9 and assumed they were at that high point for
10 that full time.

11 Outside the radiography room --
12 this is for the radiographers now. And
13 outside that radiography room we did that
14 similar to the radium estimate, where we took
15 the testimony we heard here which said, we
16 made a boundary 1.5 times the required
17 distance, and we assumed the radiographer was
18 there the entire time that the sources were
19 exposed.

20 The difference between the radium
21 one is, number one, these sources were

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1 slightly different dose but also, these would
2 have had the cameras where they remotely
3 cranked out the thing. So we did not include
4 delivering the source to and from that site
5 with the fishing pole technique.

6 For other workers, if I recall this
7 exactly, we did the similar thing for outside
8 the room that we did with the radium. We
9 assumed that they were at that boundary the
10 full time, with the exception of some amount
11 of time they may have walked through that
12 area. Like I said, this is similar to the
13 approach we took to the radium. And for the
14 rest of the time we assumed they were at the
15 boundary.

16 As far as the shooting room goes,
17 we assumed again they were at the high point
18 outside that room, where they would get the
19 highest dose from the survey that we have done
20 for the AEC and we assumed they were there the
21 entire time. So these are obviously attempts

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1 to be bounding estimates.

2 And also similar to the radium one,
3 we also accounted for someone on the roof and
4 for the crane operator. And the same
5 technique we used for the radium dose. And we
6 did that for one situation where it could be
7 anywhere in Building 6 and another situation
8 where it was in the shooting room.

9 CHAIRMAN ZIEMER: And you ended up
10 with something like six categories of exposed
11 folks from these sources. Is that right?

12 MR. ALLEN: Yes, five sources.
13 Five shooting scenarios and one, two, three,
14 four worker scenarios for each of those, which
15 is basically radiographer, non-radiographers
16 at the floor level, factory level, and crane
17 operator and roof, somebody on the roof, for
18 the four worker categories.

19 CHAIRMAN ZIEMER: Right.

20 MR. ALLEN: And then the five
21 shooting categories were the radium sources,

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1 the small cobalt-60 sources inside the
2 radiography room, the small cobalt sources
3 outside the radiography room, the St. Louis
4 Testing sources, and then the X-ray units,
5 which, we didn't come up with a number on the
6 X-ray units.

7 And then we simply chose the
8 highest one for the two worker categories. We
9 divided it into two worker categories, one was
10 radiographers and one is everybody else,
11 essentially.

12 CHAIRMAN ZIEMER: Questions for
13 Dave? Okay, let's hear from Bob, then.

14 DR. ANIGSTEIN: We simply don't
15 believe, again like I said before, that these
16 cobalt sources were taken outside the
17 radiography room because the one isotope
18 worker told us that this did not happen. And
19 I would take that over the second-hand
20 information that it did happen.

21 So in this case, and whereas the

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1 limiting dose to just outside the radiography
2 room, I don't have any objection that that is
3 a sound limiting bounding calculation and
4 therefore is fine.

5 St. Louis Testing, I said earlier,
6 is a disagreement. I had some technical
7 comments about the way the dose was calculated
8 to the workers on the roof and the crane
9 operator. But since even with the increased
10 dose it is still lower than the one outside
11 the radiography room, so it is an academic
12 question but it doesn't change the bounding
13 dose.

14 And in terms of the 80-curie
15 source, it is sort of like the other question.
16 We tried very hard to figure out how it could
17 have gotten high -- a big source. The one
18 time it was referred to as a big source and
19 then later on it suddenly became an 80-curie
20 source.

21 And the records, the AEC records

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1 which seemed to be good because they were able
2 to find everything on GSI, once they were told
3 the correct name of the company, that it was
4 not General Steel Castings but that it was
5 already General Steel Industries by the time
6 of the AEC license, and under either name
7 there were no records for the Eddystone. They
8 did apparently search by state. There were no
9 records for the Eddystone facility. They did
10 come up with the Avonmore, the National Roll,
11 which had been acquired by General Steel,
12 which is one reason they changed the name.
13 They started doing more than just castings.
14 And they did have, if I recall, a 10-curie
15 source which they stopped using in about 1958
16 or '59. I don't have it in my computer
17 because I got a hard copy. But it was about
18 '58 they stopped using it. And they said they
19 were going to sell it to another General Steel
20 facility.

21 So that immediately made me think

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1 maybe they sent it to Granite City and Granite
2 City didn't bother, just said well it is
3 licensed and we are not going to bother with
4 another license. However, that seemed to be
5 implausible because if that had happened in
6 '58 and '59 and Granite City has this big
7 source, why would they continue using the
8 radium? And why would they send this almost
9 desperate letter to AEC, please give us
10 quickly a license for these two small sources
11 because Illinois won't allow us to use the
12 radium and basically, how are we going to
13 operate? So it just seems implausible that
14 they would have had such a big source and end
15 that early.

16 And Jim, the late isotope
17 supervisor, categorically said they did not
18 have a large source. And he was there from
19 '51 through '64 and did nondestructive
20 testing. And he remained in the plant until
21 '66. And I asked him, well, once you left the

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1 betatron, would you know if they had a source.
2 He said yes because he was in touch with the
3 testing. He was assistant superintendent of
4 finishing and polishing. And he would meet
5 regularly with the testing people because they
6 were the ones that told him whether the
7 castings were good enough to ship out or not.
8 And he was confident that that source was not
9 there until he left GSI in 1966.

10 So and then the third item is how
11 in the world could they have acquired a high-
12 potency source during that time without a
13 license? And how could they have acquired it,
14 having a license already for these two small
15 sources?

16 So then if we postulate that
17 [Identifying Information Redacted] was correct
18 and it had to be after he left the betatron
19 and just didn't know that they were using
20 this, how could they possibly have gotten it
21 and then two years later told the AEC oh, we

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1 want to buy a source and please license us for
2 it?

3 And there was a record of the
4 transaction, the serial number of the source,
5 when they acquired it, when they put it into
6 effect, the leak testing done on it. And
7 several years later when they asked for
8 license termination, they itemized they
9 disposed of three sources, of course they were
10 much lower activity then but the nominally 260
11 and 280 that were about one-fourth of two
12 half-lives by then, and the 80-curie.

13 So the weight of evidence indicates
14 that they did not have that source. That is
15 basically our conclusion.

16 CHAIRMAN ZIEMER: Okay, thank you.
17 I guess I would like to ask Dr. McKeel to
18 comment. Dan, you obviously have affidavits
19 that bear on this as well. So we have
20 conflicting testimony from GSI people on this
21 issue.

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1 DR. McKEEL: This is Dan McKeel.
2 Well here is the way I would put it. It's a
3 numbers game.

4 The supervisor to whom Dr.
5 Anigstein just referred is one person. We
6 have a November, I think, 2008 affidavit
7 signed by five active GSI radiographers who
8 said that they used or helped use a 80-curie,
9 cobalt-60 source owned by GSI during the 1963
10 to '64 time period. And one of the gentlemen
11 who you have spoken to many times, who signed
12 that affidavit and got it together, left GSI
13 in November of 1966.

14 So, one of the other signers of
15 that affidavit when we discussed it over lunch
16 -- you have got to also understand we
17 discussed the small and the large cobalt-60
18 sources at every worker meeting that we had in
19 2006-2007. And there were large groups. They
20 were very well attended meetings with 20 and
21 30 workers. So they all heard it at the same

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1 time. They knew this was an active area of
2 discussion. Anyway, this affidavit resulted.

3 And so one of the signers of that,
4 we happened to be having lunch, and it
5 occurred to me that we were talking about
6 small and large and that those two words mean
7 different things to different people. So we
8 got one of the fellows to draw us a picture of
9 the large source. And the large source was,
10 and particularly he was drawing us a picture
11 of the pig now, not the radioactive source
12 itself but the pig that it was housed in. And
13 he drew a picture of a cart with a handle and
14 with two big wheels. And you know, basically
15 the pig was round. So the people that I have
16 interviewed on that indicate that the large
17 source was physically much larger than either
18 of the smaller cobalt-60 sources that were
19 used in Building 6.

20 So some of it was just, when you
21 talk about using a large source of cobalt-60,

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1 some of it was just looking at it, you know,
2 just looking at it. You don't have to have
3 any education for it. It was just big and was
4 on two wheels and it was round. And the other
5 ones were described as something you could
6 hold in your hand, much smaller and square or
7 rectangular.

8 I don't know. I never saw any of
9 them. But anyway, that was one person's
10 description.

11 So I think what you will have to
12 consider is the eyewitness testimony of five
13 workers versus one worker. One worker, as far
14 as I am aware, the supervisor never actually
15 used the large source to perform work. In
16 other words, didn't actually use it. He was
17 basically a metallurgist most of the time. He
18 supervised the betatron area and so forth.

19 The other men who you all have
20 accepted testimony from, like the pencil
21 dosimeter, said, and the people who you also

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1 have interviewed, [Identifying Information
2 Redacted] is one, [Identifying Information
3 Redacted] is another one, and [Identifying
4 Information Redacted] and so forth -- I sent
5 you all recently a copy of that affidavit with
6 all the names spelled out so that is not an
7 issue. But they are people who said they used
8 the source or helped use the source in 1963-
9 64. So you know, we can use polite language
10 or we can use -- why don't we use civil
11 language and say that you are saying that
12 those five eyewitness workers were incorrect.
13 They were factually wrong. They identified a
14 large source when there was none. It doesn't
15 necessarily make it a hallucination or a
16 delusion but as a matter of fact in
17 psychiatric terms if you see something that is
18 not there, you get into that realm of
19 cognitive activity.

20 So I'm saying, who do you believe.
21 Who is the most believable person: one versus

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1 five people who were actual eyewitnesses and
2 participated in the work or another person who
3 was basically a metallurgist? You know, I
4 don't know what to say. The workers and that
5 particular supervisor disagreed about a lot of
6 things. They disagree about people who had
7 access to the film badges and how often they
8 were accessed and were they made available to
9 the workers. It is interesting that none of
10 the workers except two ever came forward with
11 their own film badge reports.

12 So I guess you will have to weigh
13 that. But I would say that it is needed
14 sorely within this program to adopt some kind
15 of policy on how you weight various testimony.

16 I would still make the assertion
17 that, you know, I mean you all have the job of
18 weighing this evidence, this testimony. But
19 when you come right down to it, you are going
20 to have to assign veracity to one of those two
21 scenarios. And I don't know what to say.

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1 Even Dr. Ziemer admitted that he is aware in
2 the nuclear industry of instances where
3 sources were in use at facilities but they
4 were not yet licensed and sometimes they never
5 did get licensed.

6 So to say that it must have been
7 licensed if it was at the facility is simply
8 not true, based on your own Work Group
9 Chairman, whom I greatly respect and I'm sure
10 you do, too.

11 So I guess that is all I can say.
12 I am convinced that at least five people
13 thought there was a large source there,
14 regardless of what those AEC papers which
15 again I don't like to use this but I do need
16 to point out, I uncovered those records. I
17 have been through those records. In 2009, as
18 soon as I got those records, within a couple
19 of weeks, I sent you a complete index of what
20 was in them. I identified 21 issues in that
21 paper, which is now part of Docket 140.

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1 Twenty-one issues that were raised
2 by those NRC licensing documents. One of
3 them, one of the points I made in there was
4 this very one about the records saying that
5 the large cobalt-60 source was not there until
6 1968, which conflicted with what the workers
7 said. And so you know, I would have probably
8 had another White Paper to add to the mix if I
9 had gotten the issues matrices and two White
10 Papers in a reasonable amount of time to get
11 them. I got my copy of the SC&A paper by Dr.
12 Anigstein on Sunday afternoon. You know?

13 CHAIRMAN ZIEMER: Yes.

14 DR. McKEEL: So that is all I can
15 say. I think that again we do not have -- I
16 mean we, John and I believe that there was a
17 large cobalt-60 source probably used at
18 Eddystone. And that is regardless of the fact
19 that we, Dr. Anigstein and myself, on two
20 occasions now have been unable to unearth
21 Eddystone documents.

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1 And I made the point many times
2 that we filed individual FOIA documents. But
3 NIOSH, through Department of Labor, through
4 Section 7384(w) of the Act, have the ability
5 to issue a subpoena for those records. And I
6 have urged for years and still do, that that,
7 if necessary, be obtained to get the Eddystone
8 records and see if there is an 80-curie source
9 there. We know the betatron was used. We
10 know there must be film badge records, unless
11 you are going to say that Eddystone Division
12 of GSI simply had no film badge program. I
13 doubt that. I seriously doubt that.

14 You know, their personnel came down
15 here and they started a film badge program in
16 Illinois. So I don't think everybody is
17 trying hard enough to get those records. I
18 don't think they've tried with the state
19 agencies in Pennsylvania. I don't think they
20 have tried hard enough by letter writing. And
21 most of all, the ultimate tool that the Act

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1 provides is a subpoena, which is a remarkably
2 useful tool.

3 And there was a fact on your DCAS
4 website. I don't know if it is still the
5 current one or not, that said NIOSH didn't
6 ever need to use the subpoena power because by
7 implication it always got the records it
8 needed.

9 Well, I am pointing out today that
10 there are a lot of records with GSI that are
11 desperately needed that NIOSH hasn't gotten.

12 So I think that idea, that tool,
13 that powerful tool, that tool that Congress
14 occasionally will use after they exhaust all
15 other possibilities, that ought to be used a
16 lot more than it has been. And that is really
17 all I have got to say about it.

18 I think that just in summary I
19 think NIOSH dismissing that cobalt-60 source,
20 I understand the basis that they are doing it
21 because of the NRC FOIA documents, they said

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1 it wasn't purchased until 1968, but I think by
2 this time, having used lots of GSI worker
3 affidavit data to support points that they
4 wish to make, that they ought to be a little
5 bit more broad-minded and not dismiss the
6 eyewitness testimony of five good men.

7 And that's all I want to say about
8 that.

9 CHAIRMAN ZIEMER: Okay. Thanks,
10 Dan. I want to follow up on some of these
11 items a little bit.

12 I appreciate the description of the
13 large source. I have debated in my own mind
14 over a period of time how we could reconcile
15 these two sort of perspectives of what went
16 on. And it is quite true that I have seen
17 cases where sources were in use, not that they
18 were unlicensed but they were licensed by
19 another facility. And I have had these
20 experiences at my own facility where a source
21 was brought because another facility had a

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1 license which allowed them to do it,
2 unbeknownst to me.

3 And I wondered for example, did the
4 Pennsylvania facility have a license which may
5 have allowed them to bring a source here, to
6 here being to this facility, that hasn't been
7 considered or was the large source possibly in
8 fact the larger one that the St. Louis folks
9 had.

10 I had not heard this description of
11 the cart and the shield apparatus for that,
12 quote, large source. So it raises in my mind
13 the question what did the St. Louis large
14 source look like. Could that have been it?
15 Because it apparently was here at that time as
16 well.

17 DR. McKEEL: The unit that GSI
18 bought in 1968, that camera and so forth that
19 housing, that is well described and the
20 company that made it and I think it is
21 Radionics --

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1 CHAIRMAN ZIEMER: Radionics, right.

2 DR. McKEEL: -- is still around.

3 And certainly pictures of those things --

4 CHAIRMAN ZIEMER: Yes, I don't

5 remember seeing the picture of that one but do

6 we know whether that was on a cart, too?

7 I'm trying to get a feel for,

8 number one, that cart description might give

9 us a clue to where to look. Also, --

10 DR. McKEEL: It was not something

11 to be missed. I mean, it was a big thing --

12 CHAIRMAN ZIEMER: No, I understand

13 that.

14 DR. McKEEL: -- that weighed a lot.

15 CHAIRMAN ZIEMER: Right.

16 DR. McKEEL: And you didn't just

17 truck it around. And also, you know there is

18 some testimony -- I don't know how to weigh

19 this. I wasn't there 50 years ago -- that

20 that big source was taken and stored in the

21 bottom of the basement of the chem lab from

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1 time to time.

2 Now, I mean, that is just --

3 CHAIRMAN ZIEMER: Right.

4 DR. McKEEL: -- part of the facts.

5 CHAIRMAN ZIEMER: It may be that
6 there are some strings that we could pull here
7 a little bit. I don't know and I will sort of
8 pose this to Dave. Have we looked for -- do
9 we have the Eddystone?

10 DR. ANIGSTEIN: Yes, we did a FOIA.

11 CHAIRMAN ZIEMER: What did you look
12 -- you did a FOIA, Bob, and you weren't
13 successful on that.

14 DR. ANIGSTEIN: Excuse me?

15 CHAIRMAN ZIEMER: Were you
16 successful on any part of that?

17 DR. ANIGSTEIN: No. I asked for a
18 search for Eddystone, Pennsylvania, General
19 Steel Castings, or General Steel Industries
20 under both names, in that period of time. And
21 they apparently must have gone by the state

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1 because they said there is nothing for
2 Eddystone but they do have one for Avonmore,
3 which is western Pennsylvania, which was
4 originally National Rubble and Steel and
5 acquired by General Steel Castings. And I
6 discussed that a little earlier today. They
7 did have a source. They disposed of it in
8 1959.

9 CHAIRMAN ZIEMER: It was what
10 material, cobalt?

11 DR. ANIGSTEIN: It was 10-curies,
12 it was, I think 10-curie cobalt source. I am
13 going by memory. It was around in that order.
14 It was 1959 and if they had shifted to Granite
15 City, it would have been at least one half-
16 life at that time used and it might have been
17 a few curies. I suppose if you want to take
18 an extreme, make some extreme assumptions that
19 the Granite City Foundry did, also known as
20 the Commonwealth Foundry, -- it is easier to
21 discuss -- that the Commonwealth Foundry got

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1 that source and put it aside and hid it and
2 only five years later decided to use it. To
3 me that is implausible. It would not have --
4 so they would have received it and then three
5 years later, applied, three or four years
6 later, applied for an AEC license for a 300
7 millicurie source when you already had a five
8 to ten-curie source. It just doesn't make
9 sense.

10 And the other is, I did, again not
11 to be getting into personalities, but I do
12 have an account here taken from the Work Group
13 meeting on 10/14/09 where Mr. Dutko who is on
14 the phone now, mentioned that he is an
15 assistant operator in the large curie cobalt
16 source in the new betatron at one time. And
17 then he gave the name, which I won't say, well
18 I will mention [Identifying Information
19 Redacted]. I interviewed that gentleman. I
20 asked him if he remembered an 80-curie source.
21 He did. I said when did they acquire it. He

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1 could not tell me. He was there from '64
2 until '73. So it could have been any time.

3 So if the source came in '68, he
4 would have been using it.

5 CHAIRMAN ZIEMER: Do you have
6 descriptions? Are there descriptions of the
7 two smaller cobalt sources in terms of the
8 size of the storage pigs and whether or not
9 there were carts associated with those?

10 DR. McKEEL: This is Dan McKeel
11 again. I believe John just got some more
12 information on that from [Identifying
13 Information Redacted]

14 MR. RAMSPOTT: I actually, one of
15 the gentlemen you are going to be talking with
16 probably next week is one of the guys that
17 says the 80-curie source was there in the mid-
18 '60s. So you are going to have to believe
19 some of his or none of his and he is the guy
20 with all the reports.

21 DR. McKEEL: But how about the

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1 small sources?

2 MR. RAMSPOTT: The small sources
3 were in those camera devices that are
4 indicated in your --

5 CHAIRMAN ZIEMER: Okay. So those
6 are basically sort of built in. You crank
7 them out.

8 MR. RAMSPOTT: Yes, they are much
9 smaller. You could tell the difference, he
10 said.

11 CHAIRMAN ZIEMER: Right. And not
12 necessarily on carts or were those on --

13 MR. RAMSPOTT: As a matter of fact,
14 they picked those up and actually --

15 CHAIRMAN ZIEMER: Can carry them.

16 MR. RAMSPOTT: -- this is
17 something, they put those in cars and actually
18 went up to Allis-Chalmers to inspect some
19 items up there.

20 CHAIRMAN ZIEMER: Yes. Yes, those
21 are typical of small radiographic sources.

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1 MR. RAMSPOTT: Yes.

2 CHAIRMAN ZIEMER: Well the
3 description of the large pig on a cart
4 intrigues me in terms of that. It is one
5 thing just people say there was a large source
6 but the description is such that it makes you
7 wonder what was that then that they were
8 seeing.

9 MR. RAMSPOTT: Well we got
10 descriptions quite some time ago, actually
11 from one of the meetings in St. Louis, wasn't
12 it, Dan?

13 DR. McKEEL: Yes.

14 MR. RAMSPOTT: Yes, this is two or
15 three years ago that these guys drew these
16 pictures, Paul. They are not just dreaming
17 them up now.

18 CHAIRMAN ZIEMER: No, no. I
19 understand. I guess I had just missed that or
20 --

21 MR. RAMSPOTT: Sure, I did, too. I

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1 didn't pay any attention to it. They talked
2 about the big wheels on it and that is how
3 they got it up, supposedly in the basement of
4 the chem lab.

5 DR. ANIGSTEIN: We can calculate, I
6 mean I can't do it at the moment, I don't have
7 the data, but we can calculate how much lead
8 shielding would be required to take an 80-
9 curie source and reduce the level down to say
10 2 mR per hour.

11 CHAIRMAN ZIEMER: Well yes. No,
12 but --

13 DR. ANIGSTEIN: I know. I did that
14 for the smaller source. There is quite a bit,
15 I think. I came up with something like 50, I
16 am going by memory, like 50 pounds of lead.
17 Because the original report on this what
18 turned out to be the radium source, the
19 original report said that it was the small
20 cobalt source that was taken home.

21 And so I calculated how much lead

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1 would be around it and I got something like 50
2 pounds. And I said, is someone taking a 50-
3 pound pig home?

4 CHAIRMAN ZIEMER: Well, they could.
5 I'm just --

6 DR. ANIGSTEIN: I'm just saying it
7 is a lot of lead.

8 CHAIRMAN ZIEMER: Right.

9 DR. McKEEL: Well, like I said --

10 CHAIRMAN ZIEMER: The only thing I
11 am trying to do is see if there are any
12 sources that could be looked at to try to
13 establish. And Dan, I don't think any of us
14 are claiming that these individuals did not
15 see this or that this is an illusion or they
16 are not telling the right story or whatever.
17 I am trying to figure out what that was. And
18 if so, where did it come from.

19 You know, worst case here would be
20 if we said, okay, we don't know if somehow
21 this cobalt source got there and they just

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1 didn't get around to licensing it. We can
2 always add in a couple years of exposure if we
3 had to do that. I mean, you can model this
4 thing but the overriding question is how in
5 the world would they get this source and where
6 did it come from and could it have been,
7 clearly from the description it is not, one of
8 these two other sources.

9 DR. McKEEL: Right.

10 CHAIRMAN ZIEMER: And it doesn't
11 sound like it is the St. Louis Testing source.

12 DR. McKEEL: Well here is one
13 method that seems to me would be very
14 illuminating. And that would be to take the
15 NRC licensing document, the description of the
16 new 80-curie unit that was purchased in 1968
17 and retrieve photographs from the company or
18 from the ORAU museum. I'm sure there are
19 archives around that will have a photograph or
20 picture or probably drawings of that exact --

21 CHAIRMAN ZIEMER: That model.

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1 DR. McKEEL: -- unit. And then
2 compare that with what [Identifying
3 Information Redacted] drew on the napkin and
4 actually take that picture and show it to all
5 five people who signed the affidavit and say,
6 is this similar to what you saw at GSI. And
7 if the answer comes back oh, no that was
8 nothing like anything we saw, well that is one
9 thing. But suppose they all came back and
10 said, yes, that is exactly what we had.

11 And so suppose you were just
12 ordering that by the year. You know, we don't
13 have time today on, you know unless we have
14 many more meetings at an increased frequency,
15 but there are a lot of things in those NRC
16 FOIA documents that just don't square with
17 reality at that site.

18 I mean, yes, there are drawings and
19 there are all sorts of things about a safety
20 program but just on a human basis, there is
21 not a single individual who we have talked to

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1 and I think we have talked to all of the, not
2 me but John Ramspott has talked to every one
3 of the GSI people that we have known about.

4 And you know, so nobody has heard
5 of [Identifying Information Redacted], who is
6 supposed to have been the safety, the
7 radiation safety guru for GSI for at least
8 1962 to 1964. I don't know that he was.

9 CHAIRMAN ZIEMER: Yes.

10 DR. McKEEL: But it is odd to me
11 that nobody knows who he was. He was an
12 August figure. He was a heck of a scientist.
13 He had a great background, you know, and drew
14 up the radiography facility. He designed the
15 radiation safety program. He claims that NCC
16 and those documents actually wrote the test.

17 CHAIRMAN ZIEMER: Right.

18 DR. McKEEL: And it gives an
19 example of the test that they administered.
20 And yet we just interviewed [Identifying
21 Information Redacted] and said who gave you

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1 the test and do you know [Identifying
2 Information Redacted].

3 CHAIRMAN ZIEMER: He didn't.

4 DR. McKEEL: No, never heard of
5 him.

6 CHAIRMAN ZIEMER: Okay.

7 DR. McKEEL: -- somebody else who
8 was the, you know, I think the radiographer
9 probably said GSI gave him the test.

10 CHAIRMAN ZIEMER: We're going to
11 take a --

12 DR. McKEEL: All I can say is you
13 all certainly have many examples where
14 something is written down on paper, a
15 radiation safety program, but there is little
16 if any relation to exactly what happened. In
17 fact I would say at almost every big site,
18 there are major discrepancies in what actually
19 took place and what is on paper.

20 CHAIRMAN ZIEMER: Right. Okay.

21 Dan, we are going to take a break here, and I

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1 am going to ponder our next course of action.

2 A 15-minute break and we are back. Okay?

3 DR. McKEEL: Yes, sir.

4 (Whereupon, the above-entitled
5 matter went off the record at 3:03 p.m. and
6 resumed at 3:23 p.m.)

7 MR. KATZ: We're back again. Let
8 me just check on the line and see, do we have
9 John Poston, Dr. Poston with us?

10 (No response.)

11 MR. KATZ: And how about Dr.
12 McKeel? Dan are you there?

13 DR. McKEEL: Yes, I'm here, Ted.

14 MR. KATZ: And John are you there?

15 MR. RAMSPOTT: Yes, I am. Thank
16 you.

17 MR. KATZ: Okay and Terry Dutko,
18 too?

19 MR. DUTKO: I'm here. Thank you.

20 MR. KATZ: Okay, great.

21 CHAIRMAN ZIEMER: Okay, we are

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1 going to proceed here. I just, during the
2 break, thought of a couple of things that we
3 might pursue and I will ask NIOSH if they can
4 pursue this to the extent they are able.

5 One is on the known 80-curie source
6 that we know is here for sure, and we know a
7 model number for that, if we can see whether
8 we can obtain from old records somewhere what
9 that looked like. This is somewhat along the
10 lines of what you were suggesting, Dan. We
11 will try to see if we can determine what kind
12 of configuration that was in. And that will
13 at least give us a comparison with the
14 recollections of the folks that identified
15 this source as being here earlier.

16 Also, it is not clear to me that we
17 can get any more information from other
18 General Steel Industries in terms of their
19 licenses.

20 What was the other group you looked
21 at, Bob? That was also in Pennsylvania. The

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1 other --

2 DR. ANIGSTEIN: The town was
3 Avonmore, Pennsylvania.

4 CHAIRMAN ZIEMER: Avonmore, right.

5 DR. ANIGSTEIN: Avonmore and it was
6 originally called National Roll and Steel.

7 CHAIRMAN ZIEMER: Right. Did they
8 have a license?

9 DR. ANIGSTEIN: Yes, right. They
10 were licensed for a 10-curie cobalt source.

11 CHAIRMAN ZIEMER: A 10-curie
12 cobalt. And you have seen their license, have
13 you?

14 DR. ANIGSTEIN: Yes, I saw the
15 correspondence.

16 CHAIRMAN ZIEMER: Right.

17 DR. ANIGSTEIN: And they got rid of
18 their license, I believe, in '59.

19 CHAIRMAN ZIEMER: Yes, so their
20 source was too early to have been one that
21 would have come here.

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1 DR. ANIGSTEIN: I think so, right.

2 CHAIRMAN ZIEMER: And also was
3 smaller, I gather.

4 DR. ANIGSTEIN: Right.

5 CHAIRMAN ZIEMER: Okay. Well as a
6 starting point, we will see what we can learn
7 about what this source looked like and how it
8 might be paired to what was seen by the others
9 in the earlier time frame.

10 DR. McKEEL: Dr. Ziemer?

11 CHAIRMAN ZIEMER: Yes?

12 DR. McKEEL: This is Dan.

13 CHAIRMAN ZIEMER: Yes.

14 DR. McKEEL: I still think, you
15 know, Dr. Anigstein tried a FOIA request to
16 Eddystone Division of GSI and I tried two FOIA
17 requests for Eddystone Division of GSI and we
18 both came up empty. But based on other
19 experiences, I really think it would be a good
20 idea for NIOSH to make an inquiry of the NRC
21 and/or the state or both, preferably, agency

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1 that controls licensing currently just to see.
2 Give it one more try because with a great big
3 division and those great big castings and so
4 forth, even if they didn't have the betatron
5 there, which we know they did, it is bound to
6 have had a big gamma source to get through
7 those huge castings where most of the big
8 casting work was done before '63 for GSI.

9 So I just think, I think it is not
10 that they never had a license. I think it is
11 that we haven't gotten it.

12 CHAIRMAN ZIEMER: Let me ask this.
13 NIOSH, have we ever asked NRC for that
14 information?

15 MR. ALLEN: We asked NRC for
16 anything they had on -- it was --

17 CHAIRMAN ZIEMER: General Steel
18 across the board.

19 MR. ALLEN: That is what I'm trying
20 to remember or whether it was in Illinois or
21 just across the board.

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1 CHAIRMAN ZIEMER: Okay. Let's go
2 back and check on that. See if there is
3 anything that we can garner. I kind of agree
4 that at least let's take a look and see if
5 they had a license and if there is any
6 possibility that there was a source there that
7 might have somehow found its way here.

8 You know, maybe we can rule that
9 out. Maybe we can't. But let's pull that
10 string to the extent we can.

11 Now I want to take -- we basically
12 have sort of reviewed these models. We have
13 some actions that are going to follow up on
14 some of these. We are really on basically A,
15 C, and D that we have talked about.

16 But now I want to take a look at
17 the SEC matrix, not the Appendix BB matrix
18 which would be a separate question and sort of
19 will grow out of where we end up as we resolve
20 these models. But I want to look at the
21 Special Exposure Cohort matrix. And this was

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1 updated for us I think July 25th is the --

2 MEMBER BEACH: The last one was
3 September 17.

4 DR. ANIGSTEIN: No, the SEC matrix
5 was updated just last week.

6 MEMBER BEACH: September 17.

7 CHAIRMAN ZIEMER: I pulled up the
8 wrong one here.

9 MEMBER BEACH: Do you want to use
10 mine?

11 CHAIRMAN ZIEMER: Let's see. I
12 thought I had a hard copy of the most recent
13 but I have it on my computer here. Just a
14 second, let me just pull it up.

15 Okay. Let's see. You sent that
16 out, Bob, or Nancy sent that out, I guess.

17 DR. ANIGSTEIN: Yes, September 17th
18 and I think it was probably maybe sent out on
19 that day or the next day.

20 MR. KATZ: It was on Friday.

21 DR. ANIGSTEIN: Pardon?

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1 MR. KATZ: On Friday.

2 DR. ANIGSTEIN: Friday?

3 MR. KATZ: Yes. It was on Friday
4 and then the PA version was cleared Friday
5 evening.

6 MEMBER BEACH: Friday was the 16th.
7 Sunday was the 18th, so --

8 DR. ANIGSTEIN: The PA version was
9 sent out on Monday.

10 MR. KATZ: Friday night, that
11 evening. No?

12 DR. ANIGSTEIN: No, I don't think
13 so.

14 MR. KATZ: I think so because I
15 sent it to Dan on Friday.

16 CHAIRMAN ZIEMER: I've got it here.
17 I'm open.

18 And at the beginning, they have
19 just gone through the progression of what has
20 occurred on this and the various changes.

21 DR. ANIGSTEIN: Basically, it was

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1 untouched.

2 CHAIRMAN ZIEMER: Take a look at
3 the status summary, which is on page three.
4 It says issues one, two, three, five and six
5 are open. Issue four, which is residual
6 radiation from the betatron pending resolution
7 is an open issue. Seven, there was -- I
8 forget what that was. Bob, what was that?

9 DR. ANIGSTEIN: These were -- I
10 have to look.

11 CHAIRMAN ZIEMER: Okay, well I'm
12 just going to have us look at these anyway.
13 And then issue eight was incomplete. So that
14 issue is kept open. Let's see, nine was the
15 beta and issue ten was closed.

16 And then also SC&A indicated issues
17 one, three, and six are of high importance.
18 And then issues two, four, five, seven, and
19 nine are medium. And high meant, in their
20 opinion, NIOSH did not demonstrate or
21 calculate doses with sufficient accuracy.

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1 And then the others, basically an
2 agreement that they can calculate the doses
3 but the methods hadn't been fully spelled out.

4 So issue one was the lack of
5 monitoring data for '53 to '63. And I'm not
6 sure if that should be '62 or '63. Somewhere
7 in there is break point.

8 DR. ANIGSTEIN: Well lack of
9 monitoring data is through '63. Because the
10 actual data that we have starts November '63.

11 CHAIRMAN ZIEMER: Right. Right. I
12 said it includes all of '62. Anyway,
13 somewhere in there, maybe mid-'63. But in any
14 event, this is, part of this is what we talked
15 about earlier the fact that if there was in
16 fact monitoring data, we need to identify that
17 or at least confirm that there was a
18 monitoring program in existence. And there is
19 some follow-up work being done there. And
20 this gives all of the various things that
21 occurred.

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1 And the last thing here refers to
2 the path forward, which we dealt with today,
3 plus SC&A's comments on that.

4 So basically, this remains open
5 until we gather that additional information
6 that we talked about earlier today, which
7 includes -- I'll get my list here. It
8 includes the follow-ups with St. Louis Testing
9 on the -- no. The follow-up with --

10 MR. ALLEN: Two different phone
11 calls.

12 CHAIRMAN ZIEMER: Yes, SC&A
13 interview with an individual on the radium
14 sources. And was there something --

15 MEMBER BEACH: St. Louis --

16 CHAIRMAN ZIEMER: St. Louis Testing
17 as to when they were actually working there.
18 But there is two pieces there we are going to
19 follow up on. Okay.

20 Issue two, incomplete monitoring of
21 workers in the '64 to '66 time frame. We

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1 didn't specifically talk about that this time
2 but I think when we get to the point of
3 resolving, know where we are on the first
4 issue, we can focus on this and talk in more
5 detail. Because this also involves the issue
6 of the betatron operators and this business
7 about when they wore their badges and when
8 they didn't. So the related thing is there.
9 So that remains open.

10 The lack of documentation issue --
11 I'm looking to see here. The last thing we
12 have on that was the SC&A statement that they
13 have confirmed the characteristics of the
14 portable radiography sources during the AEC
15 operations. And then the concern about the
16 radium sources.

17 Now, look at this one again here
18 because I guess this one covered all the time
19 periods, didn't it? The documentation issue.
20 You were covering everything in. So the
21 radium parts though remained in question

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1 there, I think.

2 MEMBER BEACH: It looks like this
3 one goes to '73.

4 CHAIRMAN ZIEMER: Well '73 is when
5 the plant closed. Then 1958 to '63 -- take a
6 minute to review these.

7 MEMBER BEACH: The big time frame
8 was '53 to '58.

9 CHAIRMAN ZIEMER: Well that is the
10 early period, which is really mainly the
11 radium period.

12 (Pause.)

13 CHAIRMAN ZIEMER: I think the
14 bottom line on this one is at least at this
15 point, SC&A didn't agree with NIOSH's bounding
16 doses for the post-radium period.

17 This is one of those, though, that
18 I think, Bob, if I understand SC&A's position
19 on this for that period, the post-radium
20 period, I think that SC&A is agreeing that
21 that could be bounded. It still depends on

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1 the assumptions.

2 But you used the word here we
3 believe these are tractable problems which can
4 be resolved.

5 DR. ANIGSTEIN: I'm sorry. Which -
6 -

7 CHAIRMAN ZIEMER: Issue three.

8 DR. ANIGSTEIN: Yes.

9 CHAIRMAN ZIEMER: The post-radium
10 period you are comfortable on. The radium
11 period you are still uncomfortable on. And
12 then it seems to focus on the fact as to
13 whether or not there is an established
14 radiation safety program in the early years.

15 DR. ANIGSTEIN: Yes.

16 CHAIRMAN ZIEMER: And that's what
17 we have discussed this morning.

18 DR. ANIGSTEIN: Yes.

19 CHAIRMAN ZIEMER: And partially
20 that will be answered by the extent to which
21 we are able or not able to establish that, for

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1 example, the film badges were in use.

2 DR. ANIGSTEIN: Okay, yes. The
3 phone calls I will be making.

4 CHAIRMAN ZIEMER: Yes. So that
5 remains open.

6 The film badge dosimetry depended
7 on photon energies and exposure geometry. We
8 didn't really have an in-depth discussion on
9 this. And this one we are going to have to
10 focus on specifically and put those issues to
11 rest. Dr. McKeel raised the point that --

12 DR. NETON: We have a draft White
13 Paper.

14 CHAIRMAN ZIEMER: Right and there
15 is a draft White Paper that we need to look at
16 that deals with this issue. So that will
17 remain open until we can put that to bed.

18 MR. KATZ: When will we have that,
19 do you think, approximately? Just roughly.

20 DR. NETON: Weeks. A couple of
21 weeks.

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1 MEMBER BEACH: That will be out in
2 December, isn't it? Or is that a different
3 White Paper?

4 CHAIRMAN ZIEMER: No, the December
5 item is a different model. This is a
6 separate, just a paper dealing with --

7 DR. NETON: It will be very short,
8 several pages that references some charts.

9 DR. ANIGSTEIN: What this issue
10 four is about, it is not the film badge
11 sensitivity. It is the shielding by the body
12 from radiation coming, soft radiation coming
13 from behind.

14 If we believe, if there was a
15 plausible scenario where the radiation is
16 coming out of the betatron after shut down and
17 if it is below 50 keV, it will not, it would
18 not penetrate the body and reach the film
19 badge. So we are getting a dose and yet no
20 film badge reading. It is just a purely
21 hypothetical based on the ICRP.

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1 CHAIRMAN ZIEMER: Well I guess I
2 will want to see that because obviously 50 kVp
3 photons can penetrate the body. A photon, I
4 agree that a large percentage of them will
5 not.

6 DR. ANIGSTEIN: Oh, I think it is
7 down to less than one percent.

8 CHAIRMAN ZIEMER: All right. But
9 the other part of that is photons in that
10 range also cause the film badge to over
11 respond. So there is that sort of constant --
12 We just need an analysis of that, I think.

13 DR. ANIGSTEIN: Yes.

14 CHAIRMAN ZIEMER: I'm not sure even
15 --

16 DR. NETON: I think that this issue
17 came up in the context of this residual
18 radiation when the machine was turned off.

19 DR. ANIGSTEIN: Exactly.

20 CHAIRMAN ZIEMER: Right.

21 DR. NETON: And we are assigning 15

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1 millirem.

2 CHAIRMAN ZIEMER: Right. So --

3 DR. NETON: So if we are assigning
4 the dose, I don't know. I'm not sure what the
5 significance is.

6 DR. ANIGSTEIN: Oh, the thing is if
7 you are assigning the dose anyway -- okay,
8 here's the point. I still am not certain,
9 based on recent, not today but last year, I'm
10 not certain if the Appendix BB model is going
11 to be thrown out and replaced with a film
12 badge. And in that case --

13 DR. NETON: Yes.

14 DR. ANIGSTEIN: -- that is what
15 this point is.

16 If you are assigning a dose,
17 obviously, who cares.

18 DR. NETON: Exactly.

19 DR. ANIGSTEIN: But if you are
20 going to throw it out --

21 CHAIRMAN ZIEMER: If you are going

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1 to use the film badge for the --

2 DR. ANIGSTEIN: Right.

3 CHAIRMAN ZIEMER: Okay.

4 DR. ANIGSTEIN: So that is the
5 issue on that.

6 MR. ALLEN: Well that issue then
7 should be part of the December White Paper
8 that Josie mentioned with all of the modeling
9 for the betatron building and residual --

10 CHAIRMAN ZIEMER: Yes, this is part
11 of the betatron.

12 DR. NETON: Right. See a lot
13 depends on whether we consider this residual
14 radiation exposure in the film badge records
15 or not.

16 CHAIRMAN ZIEMER: Or do you assign
17 it later?

18 DR. NETON: Yes, and the fact, you
19 know, I'm not sure how we got down to the fact
20 that it could be kVp or less.

21 DR. ANIGSTEIN: -- in the ICRP 74.

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1 DR. NETON: Right. Right but what I
2 am saying is --

3 DR. ANIGSTEIN: For 90 degrees --
4 for 180 degrees.

5 CHAIRMAN ZIEMER: No. But why was
6 it 50? Was that based on the activation
7 product's average energy?

8 DR. ANIGSTEIN: Oh, no, no, no.
9 The reason it was 50 is purely hypothetical.
10 I just looked at the ICRP table, which gives
11 you the angular dependence.

12 CHAIRMAN ZIEMER: That's our worst
13 case, then.

14 DR. ANIGSTEIN: Yes, right.

15 DR. NETON: If this radiation
16 existed in low energy and they went in, then
17 it could be an unreported --

18 CHAIRMAN ZIEMER: Yes but is there
19 any reason to think it was?

20 DR. NETON: I don't know. I mean,
21 that is the --

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1 CHAIRMAN ZIEMER: Yes, okay.

2 DR. NETON: I think that is why you
3 said down here --

4 CHAIRMAN ZIEMER: That is the scope
5 of this, then.

6 DR. NETON: -- the burden will be
7 on NIOSH to figure out what to do with this
8 information.

9 CHAIRMAN ZIEMER: Yes, okay.

10 DR. NETON: It is sort of a
11 hypothetical scenario that --

12 DR. ANIGSTEIN: Well again, --

13 DR. NETON: -- can we prove a
14 negative.

15 DR. ANIGSTEIN: They claim that if
16 we have no idea what the quality of that
17 radiation was, that would help explain why the
18 film badge might be under-responding because
19 it was coming from behind. I'm just saying.

20 And certainly it is not entirely
21 hypothetical because we saw a photograph. The

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1 betatron operator's task was to go into the
2 room quickly and they would have this big
3 casting. So the betatron has to move from
4 place to place.

5 And the operator's job, he had a
6 pendant, a hanging pendant with buttons up and
7 down and laterally.

8 CHAIRMAN ZIEMER: Right.

9 DR. ANIGSTEIN: And he positioned
10 it for the next shot. So he would be looking
11 at the steel casting to see where to mark off
12 the next shot, draw a chalk outline on the
13 film. And therefore, he would have his back
14 to the betatron in a couple of photographs we
15 saw that showed him with his back to the
16 betatron.

17 All I'm saying is I just threw it
18 out as a possible explanation of why there is
19 residual radiation and we don't pick that up
20 on the film badges.

21 And if we knew what the quality of

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1 that radiation was, we could do the
2 calculation. But since we don't know then the
3 only way again -- I know this is not going to
4 happen but it just sort of intrigues me is to
5 go out to what is it funny name something with
6 N-A in it --

7 DR. McKEEL: Picatinny.

8 DR. NETON: Picatinny Arsenal.

9 DR. ANIGSTEIN: No, not that word.

10 DR. NETON: Picatinny.

11 DR. ANIGSTEIN: Not Picatinny.

12 That is in New Jersey. It was another arsenal
13 in --

14 CHAIRMAN ZIEMER: Anyways in what?

15 DR. ANIGSTEIN: In Pennsylvania
16 somewhere there which has the betatron.

17 CHAIRMAN ZIEMER: Oh, I see.

18 DR. ANIGSTEIN: It is the last
19 existing betatron. That one and China Lake in
20 Nevada.

21 CHAIRMAN ZIEMER: Well NIOSH is

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1 going to take a look at this, the film badge
2 related issues here and then --

3 DR. NETON: Well and again, if we
4 don't use the film badge, then it goes away.

5 CHAIRMAN ZIEMER: Right. So that
6 will remain open then.

7 DR. McKEEL: Paul, this is Dan
8 McKeel.

9 CHAIRMAN ZIEMER: Yes, Dan?

10 DR. McKEEL: May I make one more
11 comment about that residual radiation? I know
12 you all have struggled with it --

13 CHAIRMAN ZIEMER: Sure.

14 DR. McKEEL: -- a lot trying to
15 explain why it happens. But I also want to
16 note that among the materials that I have sent
17 to you have been some papers, I think there is
18 actually quite a large literature which says
19 that various kinds of accelerators, a lot of
20 the literature is on cyclotrons and
21 synchrotrons and so forth. But I think the

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1 principle is the same that when they are
2 basically constantly on, that if I remember
3 your analysis, you were thinking that it was
4 primarily the target that got activated, but
5 that as a matter of fact, every component in
6 that machine, in those machines, gets
7 activated.

8 And so that when a cyclotron or a
9 synchrotron, I would imagine the GSI betatron
10 as well, that particularly in the periods
11 where they were operating around the clock,
12 that they probably got massive -- I mean, they
13 got activated a lot of components in there.

14 So frankly, the thing that
15 surprises me is that the measured radiation 15
16 minutes after the source button was turned
17 off, it had decayed down to zero.

18 I mean, based on those papers that
19 many components inside the column and so forth
20 get activated, and that when those units are
21 decommissioned, there is an elaborate process

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1 you have go through because of that very fact,
2 because the components are still activated for
3 months. It is not just activated for 15
4 minutes.

5 So I am suggesting that that
6 literature contains the answer to the Jack
7 Schutz's observation and I personally find the
8 observation odd and suspect.

9 We interviewed Jack, too, you know,
10 actually for quite a while face-to-face up in
11 Milwaukee. And I was under the very distinct
12 impression -- he took told us the same story
13 and we questioned him and asked him how come
14 it was. You know, did he think personally
15 that there was any danger in being exposed to
16 the off betatron and he said oh, no, he didn't
17 think so. And then he relayed this single
18 measurement he had made to kind of confirm
19 that.

20 So anyway, I think there is a much
21 larger literature than just Jack Schutz about

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1 why particle accelerators become radioactive
2 and chronically so through activation of their
3 components. And that literature has really
4 not been explored to explain that.

5 Now if you want to know an
6 explanation of the phenomenon, and the way I
7 read the literature, including your paper with
8 Dr. Guo, as a matter of fact, and Vincent
9 Kuttemperoor's which we sent you a long time
10 ago. There were lots of components that got
11 activated. And you know, lots of components
12 in the steel, the nickel, and so forth. So I
13 am just suggesting that is another reason to
14 explain that residual radiation. I guess I
15 just wanted to make that clear.

16 CHAIRMAN ZIEMER: Yes. And let me
17 just comment on that further. Actually the
18 beam has to strike something to activate it.
19 So not all the components in the accelerator
20 get activated.

21 Typically, it is the target plus,

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1 well in medical facilities which is one we did
2 our study on, they have collimating materials
3 so the beam strikes those. And in medical
4 facilities that collimation material contains
5 a lot of their alloys. So there are a lot of
6 things in there that get activated, most of
7 which have very short half-lives. You can
8 measure them over minutes.

9 And it is true that there is some
10 long-term activation but those long-term
11 products over weeks and years relative to the
12 short-lived stuff are very low levels. The
13 stuff that gets what we call hot-fast, has
14 what is called the high cross-section, most of
15 that is very short-lived stuff.

16 Typically, you have to be close to
17 it to even measure it. A couple mR per hour
18 and it decays rather rapidly. Medical
19 facilities, you know, the technicians that
20 treat cancer for example, and these have a
21 pretty high workload, one patient after the

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1 other. So there is a lot of on-time. And
2 they are up in these voltage ranges up in the
3 high end, maybe range. Yes, they get slightly
4 activated but the radiation levels for a
5 radiation worker, a typical technician in
6 those facilities, they don't show any
7 accumulated exposure much above the detection
8 limit of their badges.

9 I mean, these are not high levels
10 that get activated. They are detectable, yes.

11 I think what we found surprising
12 about the experience that was described, the
13 15 mR per hour that went to zero was the fact
14 that it was higher than any models would
15 predict, in terms of the distances, locations,
16 and the amounts. But it didn't fit the
17 models.

18 So we had a hard time explaining in
19 terms of what we know about accelerators. But
20 what you say is correct. There is a lot of
21 things that get activated. There is some

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1 build-up over time but the levels are not very
2 high.

3 DR. McKEEL: So they are high
4 enough to require, as part of decommissioning,
5 I mean --

6 CHAIRMAN ZIEMER: Oh, yes.

7 DR. McKEEL: -- a plan that you
8 have to go through if you have such an
9 accelerator to be decommissioned.

10 CHAIRMAN ZIEMER: That is very
11 correct and the reason --

12 DR. McKEEL: Well I mean but that
13 is long-term chronic activation and it is not
14 low levels. It is enough to -- It is
15 expensive and it is high enough that it has to
16 contain those things or bury them or shield
17 them for a long time.

18 CHAIRMAN ZIEMER: That is very
19 correct. And that is based in part on what we
20 allow to get buried in this country. And I
21 don't want to get into --

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1 DR. McKEEL: Well I know but that
2 doesn't clear up what you just said about
3 linear accelerators that are -- I suspect the
4 betatrons with their poor shielding and so
5 forth, you know, they were older machines,
6 too. I remember the first electron microscope
7 that I used, which is the 50 kV thing. We
8 even worried back in those old days, my
9 professor, that that column would get
10 activated.

11 But I am sure with the betatrons,
12 that betatron beam as those electrons spin
13 around, it is not perfectly coherent. And
14 there is a fraction of the beam that spreads
15 and hits the column and the sides. And all
16 those things are constantly irradiated not as
17 high as the center of the beam.

18 CHAIRMAN ZIEMER: Right. And those
19 things that the beam hits will get somewhat
20 activated. But keep in mind what you can bury
21 in terms of readings is very, very low

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1 compared to what external exposures were
2 delivered to people.

3 DR. McKEEL: I understand.

4 CHAIRMAN ZIEMER: Yes. So in any
5 event, we do want to account for whatever
6 direct radiation occurred there and keep in
7 mind, yes, if it is slightly active, you have
8 got to dispose of it as radioactive waste.

9 DR. McKEEL: Okay.

10 DR. ANIGSTEIN: I have two
11 comments. One is the betatron user's manual,
12 I was reviewing a betatron user's manual,
13 simply refers to the tube becoming highly
14 radioactive and should be wait a few minutes
15 for it to cool off. I forget exactly how it
16 says.

17 And also something similar we have
18 heard from, interesting enough, there was
19 somebody who worked at, let's see he was an
20 Allis-Chalmers man who I don't think he was an
21 employee. He worked at GSI. I think he was

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1 employed by GSI. Later on he was hired by Los
2 Alamos and my colleague [Identifying
3 Information Redacted] remembers working with
4 him, a health physicists there. And he was
5 told again, before you change the target,
6 obviously he meant the tube because you don't
7 change the target, you have to wait for it a
8 little while because it is radioactive. But
9 that is all they referred to.

10 And the literature which I saw some
11 citations which other Dr. McKeel or John
12 Ramspott sent us, that refers to very
13 different machines. These are high energy
14 proton accelerators. So we are talking about
15 very different energy range. We are talking
16 about not 25 MeV but in the GeV range. And
17 protons are very different than photons.

18 Yes, you certainly get activation
19 there but it is not the same. It is not the
20 same process.

21 CHAIRMAN ZIEMER: Okay. Well,

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1 let's look here at these other issues. Issue
2 five, lack of validation of models of
3 radiation exposure of the operators. Let's
4 see. I think this one where we left it was
5 the issue of whether there was any
6 relationship between the film badge results
7 and the models. In part this is being
8 addressed by all of the things that you are
9 doing now. So we won't have the bottom line
10 on that until next time. So that will remain
11 open.

12 Issue six was underestimate of
13 external exposures to unmonitored workers.
14 And again this becomes a modeling issue, the
15 category of non-radiographers.

16 Looking at your final one here, you
17 had some with different assumptions here, Bob,
18 on this one. Right?

19 DR. ANIGSTEIN: Three and six are
20 the only ones that had --

21 CHAIRMAN ZIEMER: This includes

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1 things like how much time do they spend on the
2 periphery --

3 DR. ANIGSTEIN: Yes.

4 CHAIRMAN ZIEMER: -- the 50
5 percent. We talked about that earlier. Those
6 are modeling issues that occur once you assume
7 that you can reconstruct dose what is a
8 reasonable bounding value that will give you
9 sufficient accuracy.

10 And so --

11 MR. DUTKO: Dr. Ziemer?

12 CHAIRMAN ZIEMER: Yes.

13 MR. DUTKO: I have a question for
14 you.

15 CHAIRMAN ZIEMER: Yes.

16 MR. DUTKO: On this Los Alamos
17 Accelerator Handbook, states that everything
18 in the shooting room was hot; dust, air, dirt,
19 water, oil, metal. That's something to
20 consider, I think.

21 CHAIRMAN ZIEMER: Well, we do know

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1 that for example that if they are irradiating
2 uranium, I think we have already talked about
3 and this will come up again with the beta
4 there, there is some activation and some
5 activation products there. There is some
6 potential uranium oxides I think it was
7 surface materials that might be contaminants.

8 The air activation is going to be
9 treated under the betatron section. So yes,
10 we will be looking at these various
11 components. But those are not part of the
12 smaller sources that those don't produce those
13 particular sources of exposure.

14 MR. DUTKO: Twenty-five MeV is not
15 part of that?

16 CHAIRMAN ZIEMER: The 25 MeV is the
17 --

18 MR. DUTKO: I thought it was 10 MeV
19 and above causes that.

20 CHAIRMAN ZIEMER: Yes, that is for
21 the betatrons, which we were only dealing

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1 today with the smaller sources. The betatrons
2 will be part of this at the next session, yes.
3 But you are quite right. Those do indeed
4 produce additional activation, yes.

5 MR. DUTKO: Thank you.

6 DR. ANIGSTEIN: Are we still on
7 issue six?

8 CHAIRMAN ZIEMER: We are if you
9 have a comment on it.

10 DR. ANIGSTEIN: Well, yes. I think
11 there was a misunderstanding because issue six
12 we specifically say the last box, SC&A review
13 of NIOSH report is that we do not believe
14 there was any -- it is not a question of
15 modeling -- we do not believe there is
16 sufficient information for estimating doses
17 during the radon period.

18 CHAIRMAN ZIEMER: Oh, you are in
19 the radon period.

20 DR. ANIGSTEIN: Right the radium.

21 MEMBER BEACH: Radium.

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1 DR. ANIGSTEIN: During the radium
2 period.

3 CHAIRMAN ZIEMER: The radium
4 period. Yes, okay. My mistake. I was
5 looking at the St. Louis Testing stuff.

6 DR. ANIGSTEIN: Yes, that was the
7 second part.

8 CHAIRMAN ZIEMER: Right.

9 DR. ANIGSTEIN: I am trying to keep
10 it concise so we don't break apart.

11 CHAIRMAN ZIEMER: So that remains
12 open.

13 CHAIRMAN ZIEMER: Dose
14 reconstruction. Issue seven, dose
15 reconstruction not based on best available
16 science. There were some errors that were
17 cited, Bob. I am trying to remember what they
18 were specifically.

19 DR. ANIGSTEIN: One of them was
20 actually a spreadsheet, an error in
21 calculating the dose rate from irradiated

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1 uranium, which was actually about 20-fold
2 higher because there was an error in how the
3 NCNP run and it stipulated the density of the
4 uranium.

5 CHAIRMAN ZIEMER: Right. But this
6 one will come up in the betatron discussion.

7 DR. ANIGSTEIN: Right.

8 CHAIRMAN ZIEMER: So that will --

9 DR. ANIGSTEIN: Yes.

10 CHAIRMAN ZIEMER: -- be considered
11 next time.

12 DR. ANIGSTEIN: Well only three and
13 six were relevant to --

14 CHAIRMAN ZIEMER: Right.

15 DR. ANIGSTEIN: -- the recent, what
16 happened this past month.

17 CHAIRMAN ZIEMER: Right. Issue
18 eight, incomplete model used for exposure
19 assessments.

20 (Pause.)

21 CHAIRMAN ZIEMER: This again

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1 includes the betatrons and the neutron and
2 photon ratio. So that is going to be handled
3 next time, primarily, I think.

4 Issue nine, underestimate of beta
5 doses. Again, those are only going to arise
6 in the betatron --

7 DR. ANIGSTEIN: Correct.

8 CHAIRMAN ZIEMER: -- issue next
9 time. So that will carry forward.

10 And issue ten --

11 MEMBER BEACH: Is closed.

12 CHAIRMAN ZIEMER: -- is closed. So
13 that is sort of just give us an update of what
14 we have to be looking toward in terms of
15 coming to closure on the SEC petition.

16 So there is still a lot of work
17 ahead of us. I do want to see if there is --
18 I want to talk about next meeting but let's
19 see if there is any other questions or
20 comments that need to be raised here today by
21 either Work Group members, NIOSH, or SC&A.

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1 DR. NETON: None here.

2 CHAIRMAN ZIEMER: Okay or
3 petitioners. Dan, do you have any other
4 comments here before we look at next meeting
5 time?

6 DR. McKEEL: No, I think that's
7 fine.

8 CHAIRMAN ZIEMER: Okay. We have
9 due to us several more components of the
10 modeling from NIOSH. And I think the due date
11 is the end of December as I recall. It is the
12 most productive week that NIOSH has on their
13 calendar. It is Christmas week. Right?
14 Anyway, something like December 31st or
15 something as I recall.

16 But anyway, we are going to assume
17 that NIOSH will hit that fairly close.
18 Sometimes they are better at that than others
19 but at least that is the intent to have that
20 ready. And then SC&A will need a few weeks, I
21 guess to review that.

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1 DR. ANIGSTEIN: Yes, a little more
2 than this time. This one, you notice it hit
3 us at the worst possible time. We didn't get
4 the report until along about Sunday evening.

5 CHAIRMAN ZIEMER: Right.

6 DR. ANIGSTEIN: I didn't see it
7 until August 10th and I had other --

8 CHAIRMAN ZIEMER: Right.

9 DR. ANIGSTEIN: We need a good
10 couple of months.

11 CHAIRMAN ZIEMER: A couple of
12 months.

13 MR. KATZ: A couple of months?

14 DR. ANIGSTEIN: Well, to make sure
15 that you know, as much as I am interested in
16 this project, I can't always devote my full
17 time to this.

18 CHAIRMAN ZIEMER: Well the other
19 part of it is, both the Work Group and the
20 petitioners need to see that a little more in
21 advance of the meeting.

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1 DR. ANIGSTEIN: Sorry?

2 CHAIRMAN ZIEMER: We need to see
3 the --

4 DR. ANIGSTEIN: Well, I know it.

5 CHAIRMAN ZIEMER: And some of us
6 you know, I was still reading your stuff last
7 night. I'm sure the petitioners are in the
8 same boat.

9 DR. ANIGSTEIN: Yes. Well we sent
10 it over on Tuesday. Last Tuesday it was sent
11 out.

12 CHAIRMAN ZIEMER: Well, I didn't
13 get it.

14 DR. ANIGSTEIN: Well it was dated
15 the 15th.

16 CHAIRMAN ZIEMER: No, I don't think
17 it went out on Tuesday.

18 MR. KATZ: It went out on Thursday.

19 DR. ANIGSTEIN: Well no, not the
20 SEC -- the report.

21 MR. KATZ: Thursday.

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1 DR. ANIGSTEIN: It went out on the
2 15th.

3 DR. McKEEL: I got it Sunday
4 evening at 6:00.

5 MR. KATZ: Yes, you had it when it
6 was PA cleared, Dan. And it was only PA
7 cleared Friday evening.

8 CHAIRMAN ZIEMER: Well, in any
9 event --

10 MR. KATZ: But we only got it a day
11 before that anyway.

12 DR. ANIGSTEIN: Anyway, I
13 completely agree that it should be done
14 earlier.

15 CHAIRMAN ZIEMER: Right.

16 DR. ANIGSTEIN: We need, you know,
17 I don't mean to sound, make an inappropriate
18 comment, but you know, NIOSH gets six months
19 to a year lead time to prepare a report and
20 then we are expected to do a two-week
21 turnaround.

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1 CHAIRMAN ZIEMER: No. Obviously,
2 you can't necessarily jump on it two minutes
3 after it comes in. So we understand that.

4 DR. ANIGSTEIN: Yes.

5 CHAIRMAN ZIEMER: In any event, I
6 looked yesterday with Ted at some potential
7 times. Ted, do you remember what they were?
8 We actually, I'm going to pull my calendar
9 out. But I think we -- we had some times when
10 we can't meet.

11 MR. KATZ: Right. Well we looked
12 in context because we were looking at dates
13 for the Procedures Subcommittee and trying to
14 possibly --

15 CHAIRMAN ZIEMER: Yes, the
16 Procedures Subcommittee is meeting early next
17 year. Early meeting, I think February.

18 MEMBER MUNN: No. I think we have
19 got to change a date.

20 CHAIRMAN ZIEMER: Or sooner than
21 that.

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1 MEMBER MUNN: Yes, we have got
2 January 9th.

3 CHAIRMAN ZIEMER: Well January 9th
4 is too soon for us.

5 MR. KATZ: Oh, yes. That gives Bob
6 no time.

7 CHAIRMAN ZIEMER: And so I am
8 wondering if it is possible to do it early
9 February. I think Bob you are saying probably
10 not for SC&A. So that means we are going to
11 get -- and I've got conflicts from mid-
12 February through the end of that month. So I
13 think we are going to be into the first week
14 of March.

15 MEMBER MUNN: Yes, we have the full
16 Board meeting in San Jose.

17 MR. KATZ: So let's set a date for
18 this one but then I would just like to raise a
19 question about whether we need a meeting in-
20 between or not. Let's set this --

21 DR. McKEEL: This is Dan McKeel --

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1 CHAIRMAN ZIEMER: If we get
2 feedback on these other issues.

3 MR. KATZ: Yes, so let's figure
4 this one out for the December report --

5 CHAIRMAN ZIEMER: At least.

6 MR. KATZ: -- and then keep open
7 the question of whether we don't need one
8 sooner.

9 CHAIRMAN ZIEMER: Yes. Let me ask,
10 to start with, would the week of March 5th,
11 Bob, do you think that would be soon enough?

12 DR. ANIGSTEIN: It sounds it,
13 provided --

14 CHAIRMAN ZIEMER: If you get it by
15 the --

16 DR. ANIGSTEIN: Yes, provided it is
17 December 30th, sure. That should be fine.

18 CHAIRMAN ZIEMER: What day of the
19 week would be good?

20 MEMBER MUNN: I won't be available
21 that week.

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1 CHAIRMAN ZIEMER: You're not
2 available that week, Wanda?

3 MEMBER MUNN: No. It would have to
4 be the end of the next week.

5 CHAIRMAN ZIEMER: How about the
6 next week?

7 MEMBER MUNN: The end of the week
8 after that.

9 CHAIRMAN ZIEMER: Like what, the
10 15th?

11 MEMBER MUNN: I would prefer
12 the -- yes, that week, I think.

13 CHAIRMAN ZIEMER: How is the 15th?
14 I mean, we can pencil this in subject to
15 change. I am going to need to check with Dr.
16 Poston. Are you back on the line?

17 MR. KATZ: John Poston, are you on
18 the line with us again?

19 CHAIRMAN ZIEMER: And really Mark
20 also.

21 MR. KATZ: Mark is difficult to get

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1 in any event. The Ides of March we are
2 saying.

3 CHAIRMAN ZIEMER: Yes, that sounds
4 a little --

5 Dan McKeel, how does that look for
6 you?

7 DR. McKEEL: That's fine but I
8 would like to respond. I think we desperately
9 need another meeting. I mean, --

10 CHAIRMAN ZIEMER: Well we are going
11 to look at having one before that for these
12 other issues. But this one --

13 DR. McKEEL: Yes, I think we really
14 do. You know, we had a nice review of what
15 the issues matrix said but we actually got
16 zero done on resolving any of those. And at
17 this rate, I predicted when the path forward
18 came as something that NIOSH was going to do
19 last October, that it was going to be at least
20 a year and maybe two. And unless we hurry up,
21 it is going to be closer to two. It is

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1 certainly not going to be one.

2 CHAIRMAN ZIEMER: Yes, you have
3 underestimated, I bet, Dan.

4 DR. McKEEL: Well I have but by
5 this time, it is --

6 CHAIRMAN ZIEMER: No, I know what
7 you are saying.

8 DR. McKEEL: -- it's reaching from
9 my point of view, totally unreasonable --
10 point of view.

11 And I would point out that Wanda
12 Munn has made many speeches which I actually
13 agree with. But there comes a time when you
14 have to say you have got all that you are
15 going to get. Now I know you plan to keep on
16 continuing it.

17 But on the SEC issue, you know, it
18 seems to me that we said today that SC&A
19 believes that NIOSH cannot bound a dose for
20 the radium period and for the first ten years.
21 And you said that that could be an SEC issue

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1 and it is an SEC issue. And now we have a few
2 things to do about the radium issue.

3 So if we had followed through, made
4 our inquiries, got the information we could
5 get in the follow-up actions and then had a
6 meeting and try to close the radium issue, if
7 the consensus was that this Work Group, for
8 instance, agrees with SC&A, that the radium
9 doses cannot be bounded, then a recommendation
10 for an SEC for the first ten years, that could
11 go forward to the full Board.

12 MR. KATZ: That's correct, Dan.
13 That is what we are getting to is seeing about
14 a meeting in-between. And certainly it is
15 important these issues we are trying to pin
16 down the final bits of information related to
17 radium or the important reasons for having it.

18 DR. McKEEL: I understand all that.
19 I'm just saying that my vote is to please
20 let's have a meeting in-between.

21 MR. KATZ: Right. That's what we

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1 are trying to do, Dan.

2 CHAIRMAN ZIEMER: That's the next
3 step here.

4 MEMBER BEACH: So can we do that as
5 early as November and maybe discuss those
6 early years in December?

7 CHAIRMAN ZIEMER: I think we could
8 meet, in my mind we could meet in November and
9 perhaps come to closure on radium.

10 MR. KATZ: Right.

11 MEMBER BEACH: That would be
12 wonderful.

13 CHAIRMAN ZIEMER: Wanda is gone
14 from what to what, Wanda?

15 MEMBER MUNN: I'm gone from
16 November 6th until the end of the Tampa
17 meeting, December 10.

18 CHAIRMAN ZIEMER: And she won't be
19 at a place where she can phone either.

20 MEMBER MUNN: I can't phone in.

21 MR. KATZ: Well what about that

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1 first week of November, though? The first
2 week of November. In other words --

3 MEMBER MUNN: It works for me.

4 MR. KATZ: It is a partial week but
5 the week of the first, second, third of
6 November.

7 MEMBER MUNN: Yes, I could be there
8 the first or second.

9 MR. KATZ: That's okay on my
10 calendar.

11 CHAIRMAN ZIEMER: Yes, I could do
12 first or second or even the third.

13 MEMBER MUNN: Well, I need to be
14 home by the third.

15 MR. KATZ: Are you available the
16 second or third? And Dave?

17 MR. ALLEN: I'll make myself
18 available.

19 MR. KATZ: Okay.

20 CHAIRMAN ZIEMER: Second or third?
21 Which works better?

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1 MEMBER BEACH: Wanda wants to be
2 home by the third.

3 MR. KATZ: I think second would be
4 better for our westerners.

5 CHAIRMAN ZIEMER: Okay, Dan McKeel,
6 we are looking at November second.

7 DR. MCKEEL: That would be fine.
8 That would be great.

9 MR. KATZ: And let me just ask, do
10 we feel like this needs to be a face-to-face
11 meeting?

12 CHAIRMAN ZIEMER: Depending on what
13 we get. Do you have any other groups meeting
14 here that week?

15 MR. KATZ: I have a -- that week, I
16 think not yet but that doesn't mean we won't.
17 Because --

18 CHAIRMAN ZIEMER: I would --

19 MR. KATZ: I'm trying to schedule
20 some other Work Group.

21 CHAIRMAN ZIEMER: I wouldn't

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1 anticipate we would have all day for radium
2 and maybe we could do it in a half day or a
3 couple hours by phone.

4 But if we could block the day off
5 right now, then we could make a decision.

6 I mean for example, it is easy for
7 me to get here. But if Wanda is here for
8 something else, but that is not likely based
9 on your schedule, I guess. Right?

10 MEMBER MUNN: Not unless it is on
11 the first.

12 CHAIRMAN ZIEMER: And Josie the
13 same way. It's quite a trip out here. If we
14 only have a three-hour meeting, it is pretty
15 tough.

16 MEMBER BEACH: It's just the same
17 as any other meeting.

18 CHAIRMAN ZIEMER: All right.

19 MEMBER BEACH: I just get to go
20 home on the day of the meeting or the day
21 after.

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1 CHAIRMAN ZIEMER: Okay.

2 MR. KATZ: Okay, well if someone
3 has a preference about face-to-face versus --
4 I mean, we can always do face-to-face if that
5 is the preference. But it seems to me
6 generally speaking if it is less than a half a
7 day's work, it is nice to do it by
8 teleconference and not drag people across the
9 country.

10 MEMBER MUNN: Yes, for the most
11 part, anything that has any degree of
12 specificity involved or a lot of discussion,
13 we might as well make it face-to-face. It is
14 really helpful to be able to --

15 MR. KATZ: So you are voting for it
16 being in person?

17 MEMBER MUNN: Well only if the
18 material we are going to cover is going to be
19 lengthy enough for us to seriously consider
20 it.

21 MR. KATZ: And it seems like you

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1 have discussed most of the technical material
2 related to this. And now you are going to get
3 some answers, some viewpoints.

4 CHAIRMAN ZIEMER: We are going to
5 get some information back from these contacts
6 that are made and --

7 DR. NETON: It's hard to say how
8 it's going to come out.

9 MR. KATZ: Okay, well let's play it
10 by ear. We will keep it open, the idea that
11 it could be face-to-face.

12 CHAIRMAN ZIEMER: Okay.

13 MR. KATZ: We'll sort that out when
14 we get some --

15 CHAIRMAN ZIEMER: When we get the
16 information.

17 MR. KATZ: -- information from the
18 interviews.

19 CHAIRMAN ZIEMER: So we will try to
20 close at least that. And we are talking
21 basically here about '53 to '62, I think is

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1 what we are talking about.

2 DR. NETON: Right.

3 CHAIRMAN ZIEMER: And let me add
4 this to it, that if in fact we were to say
5 that this should become a Special Exposure
6 Cohort, we would have to figure out how the
7 Class would be described. And I don't think
8 we would know it at that point. So it would
9 have to be more of a general -- and actually
10 we can't make the decision anyway. It would
11 be a recommendation to the Board.

12 MR. KATZ: Yes. I think we would
13 have input from DOL.

14 DR. NETON: Yes, we would be able
15 get some input from DOL but my guess is at
16 this point --

17 CHAIRMAN ZIEMER: No, we get the
18 Work Group recommendation. And then from
19 there if there is an action needed, it could
20 go forward to the Tampa meeting. Okay?

21 MR. KATZ: Right.

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350

1 CHAIRMAN ZIEMER: Okay?

2 MR. KATZ: Very good.

3 CHAIRMAN ZIEMER: Any further
4 comments or questions? If not, we stand
5 adjourned. Thank you, everyone.

6 (Whereupon, the above-entitled
7 matter went off the record at 4:17 p.m.)

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