

This transcript of the Advisory Board on Radiation and Worker Health, Savannah River Site 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 Savannah River Site 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  
CENTER FOR DISEASE CONTROL  
NATIONAL INSTITUTE FOR OCCUPATIONAL  
SAFETY & HEALTH

+ + + + +

ADVISORY BOARD ON RADIATION AND  
WORKER HEALTH

+ + + + +

WORK GROUP ON SAVANNAH RIVER SITE

+ + + + +

MEETING

+ + + + +

THURSDAY  
FEBRUARY 3, 2011

+ + + + +

The Work Group met in the Zurich Room of the Cincinnati Airport Marriott, 2395 Progress Drive, Hebron, Kentucky, at 9:00 a.m., Mark Griffon, Chairman, presiding.

MEMBERS PRESENT:

MARK GRIFFON, Chairman  
BRADLEY P. CLAWSON, Member\*  
MICHAEL H. GIBSON, Member  
PHILLIP SCHOFIELD, Member\*

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ALSO PRESENT:

TED KATZ, Designated Federal Official  
ISAF AL-NABULSI, DOE\*  
LIZ BRACKETT, ORAU Team\*  
HARRY CHMELYSKI, SC&A\*  
JEFFREY KOTSCH, DOL\*  
TOM LABONE, ORAU Team\*  
JENNY LIN, HHS\*  
JOYCE LIPSZTEIN, SC&A  
MIKE MAHATHY, ORAU Team  
ARJUN MAKHIJANI, SC&A  
CAROL MCGOWAN  
WILLIAM MCGOWAN  
ROBERT MORRIS, ORAU Team\*  
JIM NETON, DCAS  
DANIEL STANCESCU, SC&A  
TIM TAULBEE, DCAS  
BOB WARREN\*

\*Present via telephone

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P R O C E E D I N G S

9:00 a.m.

MR. KATZ: This is the Advisory Board on Radiation and Worker Health, Savannah River Site Work Group and I am Ted Katz, I am the Designated Federal Official for the Advisory Board so we will do roll call please for all agency-related individuals, contractors, et cetera. State your conflict of interest situation with Savannah River as well when you respond to roll call. So we will begin with Board Members in the room.

CHAIRMAN GRIFFON: Mark Griffon, Chair of the Work Group on Savannah River Site. No conflict on Savannah River.

MEMBER GIBSON: Mike Gibson, Member of the Work Group, no conflict.

MR. KATZ: And Board Members on the line.

MEMBER SCHOFIELD: Phil Schofield, no conflict.

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1 MR. KATZ: And do we have Brad yet?

2 Mr. Clawson? Okay. I know that he is  
3 planning to join us. Let's move on to NIOSH-  
4 ORAU Team in the room.

5 DR. NETON: This is Jim Neton,  
6 NIOSH, no conflict with Savannah River.

7 DR. TAULBEE: This is Tim Taulbee,  
8 NIOSH, no conflict with Savannah River.

9 MR. STANDESCU: Daniel Stancescu  
10 from NIOSH, no conflict.

11 MR. MAHATHY: Mike Mahathy no  
12 conflict, ORAU.

13 MR. KATZ: And NIOSH-ORAU Team on  
14 the line.

15 MS. BRACKETT: Elizabeth Brackett,  
16 ORAU Team, no conflicts.

17 MR. KATZ: Any other NIOSH-ORAU  
18 Team on the line?

19 MR. LABONE: Yes, this is Tom  
20 LaBone and I am conflicted at Savannah River.

21 MR. KATZ: Okay, carry on. Okay,

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1 SC&A in the room.

2 DR. MAKHIJANI: Arjun Makhijani, no  
3 conflict.

4 DR. LIPSZTEIN: Joyce Lipsztein, no  
5 conflict.

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

7 DR. CHMELYNSKI: Harry Chmelynski,  
8 SC&A, no conflict.

9 MR. KATZ: Okay, and now federal  
10 officials, whether HHS or other agencies,  
11 there are none in the room right now, but on  
12 the line?

13 MS. LIN: Jenny Lin, HHS.

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

16 MR. KOTSCH: Jeff Kotsch, DOL.

17 MR. KATZ: Okay, then last but not  
18 least, members of the public beginning in the  
19 room.

20 MR. MCGOWAN: William McGowan. M-C-  
21 G-O-W-A-N.

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1 MS. MCGOWAN: Carol McGowan.

2 MR. KATZ: Carol McGowan, welcome.

3 And members of the public on the line.

4 MR. WARREN: This is Bob Warren.

5 MR. KATZ: Welcome Bob. Any other  
6 members of the public on the line who want to  
7 identify themselves. Very good. Let me note  
8 for the folks on the line please mute your  
9 phones, if you don't have a mute button use \*6  
10 to mute it and then use \*6 again you want to  
11 come off mute and please don't put the call on  
12 hold at any point, dial back in if you need to  
13 leave for a piece. There's an agenda, it  
14 should be on the website at this point and it  
15 has been distributed to everyone in the Work  
16 Group. Dr. Lockey will not be attending this  
17 meeting. We expect Brad to check in when he  
18 joins us. I am just going to put the phone on  
19 hold for a second.

20 (Whereupon, the above-entitled  
21 matter went off the record at 9:06 a.m. and

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1 resumed at 9:08 a.m.)

2 MR. KATZ: We're back online.

3 Thanks for your patience on the line.

4 Mark?

5 CHAIRMAN GRIFFON: Good morning,  
6 everyone. This is Mark Griffon. And the  
7 agenda for the meeting today is on the  
8 website. And it's based on the -- if you  
9 don't have a copy in front of you, it's based  
10 on the outstanding -- we've been calling them  
11 matrix of issues that were developed by SC&A  
12 regarding the SEC petition report from NIOSH  
13 and the addendum to that petition report.

14 And it was matrix items 1 through  
15 23, I guess --

16 DR. MAKHIJANI: Five.

17 CHAIRMAN GRIFFON: Twenty-five?

18 DR. MAKHIJANI: I can tell you.

19 CHAIRMAN GRIFFON: Okay. Anyway.

20 There's a number of matrix items and at the  
21 start of the meeting, we're going to go just

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1 in order as they appear in the matrix. We  
2 might go off that order just to accommodate  
3 some schedules at certain points. But we'll  
4 start with Matrix Item 1, which is thorium-232  
5 dose reconstruction model for 1953 to '65.

6 And I think at this point, the  
7 last action we had was SC&A was reviewing the  
8 addendum report, right, and a couple of weeks  
9 ago, SC&A put out their response document to  
10 NIOSH's report.

11 DR. MAKHIJANI: That is correct.

12 CHAIRMAN GRIFFON: So perhaps you  
13 can summarize that for us? You or Joyce,  
14 Arjun?

15 DR. MAKHIJANI: Yes, I'll just  
16 kind of introduce it and let Joyce present her  
17 report --

18 CHAIRMAN GRIFFON: Yes.

19 DR. MAKHIJANI: Because she's the  
20 author of the report.

21 Basically, as you know, during the

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1 -- in the Evaluation Report, thorium was  
2 reserved up to 1960. And then when NIOSH  
3 issued its addendum, they said that the  
4 thorium reserve period would be extended to  
5 '65 and the dose reconstruction method for  
6 that period was put forward.

7           There is another thorium report  
8 that we're still reviewing. That's the next  
9 item. But basically our findings were in two  
10 broad areas. There were a number of findings  
11 but they were in two broad areas.

12           One area was that most of the  
13 thorium activities that took place at Savannah  
14 River were not covered in the addendum. So  
15 there are a lot of thorium activities for  
16 which we have no dose reconstruction method.  
17 And we had discussed this briefly in the  
18 November meeting when we had given you a  
19 preliminary look at our findings.

20           And the other set of findings  
21 relate to the specific method suggested for

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1 the 300-M area of thorium work. And we had a  
2 number of findings.

3 I just want to call attention that  
4 in the meeting about a year ago, in January of  
5 2010, we discussed whether the non-  
6 construction worker piece ought to be covered  
7 by SC&A.

8 And at that time, we were told  
9 that if the non-construction worker -- if the  
10 construction worker review led to non-  
11 construction worker findings, since the data  
12 are mixed up, that we ought to call attention  
13 to that. But we were not to review non-  
14 construction worker issues as construction.  
15 And we have called attention to the fact that  
16 most of the findings apply to both  
17 construction and non-construction workers.

18 And with that, I'll just turn it  
19 over to Joyce.

20 DR. LIPSZTEIN: So our first point  
21 was methodology. And the first thing was that

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1 the ER addendum said that all high bioassay  
2 sample results were less than the detection  
3 limits. So we went by and looked one by one,  
4 all the bioassay results that we had. And I  
5 couldn't find it because it was handwritten,  
6 about 90 percent of the names. So I went  
7 right to the file part of the record of those  
8 workers.

9 And most of the workers, most --  
10 many samples had a detection limit above .5  
11 dpm per 1,500 mL sample, which is the  
12 detection limit. Some of the samples had a  
13 note saying that there was a contamination so  
14 they repeated the samples. Some of them  
15 didn't have this note but the sample were  
16 repeated some time later for the same worker.

17 So I took all those results that I wasn't  
18 sure if they were contaminated or not and  
19 still like that I had many, many samples that  
20 were above the detection limit.

21 The other thing that I noticed

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1 from these bioassay samples, they were not  
2 from the 300 area. They were from area 773.  
3 All the workers that were -- had bioassay  
4 samples were from this particular area.

5 And unless, you know, the majority  
6 of the workers were counted by bioassay  
7 samples only once. So we don't know if the  
8 workers did and there was, you know, a  
9 particular job that they were doing. I don't  
10 know if the workers worked there all the year  
11 around.

12 But they were not sampled all year  
13 round. You know they were scheduled like some  
14 people were sampled in January, some people  
15 were sampled in May. I don't know what  
16 happened.

17 So there are many unknowns but the  
18 fact is that the bioassay sample results were  
19 not all less than the detection limits. Many  
20 of them were above the detection limits. They  
21 were from area 773-A and they were, in

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1 general, counted -- monitored only once.

2 DR. MAKHIJANI: Could I add  
3 something to that?

4 DR. LIPSZTEIN: Yes.

5 DR. MAKHIJANI: I think you might  
6 have said it but there was a very narrow  
7 window in which all the data were from -- from  
8 late 1955 into the mid-1956. So there's just  
9 a short period. And we weren't able to find  
10 any other bioassay data.

11 DR. LIPSZTEIN: Yes, that's true.  
12 They were all from November `55 to May `56,  
13 all the samples.

14 CHAIRMAN GRIFFON: October `56  
15 now?

16 DR. LIPSZTEIN: Yes.

17 CHAIRMAN GRIFFON: Yes, it says  
18 October `56 in the report.

19 MEMBER CLAWSON: Mark?

20 CHAIRMAN GRIFFON: Yes.

21 MEMBER CLAWSON: Just to let you

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1 know. This is Brad. I'm on the line. Sorry  
2 about that.

3 MR. KATZ: No, welcome, Brad.

4 MEMBER CLAWSON: Okay.

5 CHAIRMAN GRIFFON: Can you hear us  
6 okay everybody on the line by the way?

7 MEMBER CLAWSON: Yes. I can --

8 CHAIRMAN GRIFFON: Okay.

9 MEMBER CLAWSON: I can hear you  
10 real good. It's coming in real good. I just  
11 didn't want to interrupt Joyce and stuff. But  
12 I wanted to let you know I was on the line.

13 CHAIRMAN GRIFFON: Okay. Glad  
14 you're here, Brad. Thank you.

15 Go ahead, Joyce.

16 DR. LIPSZTEIN: The other thing is  
17 that those bioassay samples, while as was  
18 stated in the SRS -- Technical Basis Document,  
19 they were well done. All of them, if you look  
20 also at the log bioassay samples, from time to  
21 time, they do a blank sample to confirm that

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1 everything was done correctly. So I think  
2 those are results that can be transferred and  
3 there is no specification to turn them down.  
4 They are good set of bioassay data. So that's  
5 our second finding.

6 We don't know -- NIOSH says on the  
7 ER report that all target bioassay data were  
8 reported as less than the detection limits.  
9 Therefore, NIOSH is making the inhalation  
10 using the target to certitude\* detection limit  
11 and evaluated the results.

12 The result annual inhalation rate  
13 of 350 picocuries per day was derived. I'm  
14 just repeating what's in the ER. That rate  
15 was assumed to be 1965. And then this value -  
16 - although this value is higher than the  
17 intake rate using the random data, such an  
18 intake rate would equate to a constant air  
19 concentration for thorium-232 of 34 picocuries  
20 per cubic meter, which is significantly higher  
21 than the thorium-232 maximum permissible

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1 concentration average over the entire expanse  
2 of time from `53 to `65.

3 So given this information, NIOSH  
4 does not find that the thorium-232 limit of  
5 detection provides a plausible analysis of  
6 potential thorium intakes.

7 So we don't know -- so I don't  
8 know why the bioassay was discarded, as I told  
9 you before. And calculation of air  
10 concentration based on the assumption that all  
11 bioassay samples are equal to minimal  
12 detection levels is not correct. So some  
13 think that shouldn't have been done.

14 So -- and we cannot compare the  
15 results from Area 773-A with the air  
16 concentration in Area 300. So that's  
17 something.

18 I don't know. Should I proceed  
19 everything and then --

20 DR. NETON: No, no, let's stop and  
21 talk about that. I missed a little bit of

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1 this but what I read in your report was you're  
2 saying that the bioassay samples that we used  
3 -- or that we looked at for thorium -- was it  
4 like 200 and something -- 260-samples?

5 And our report indicated that they  
6 were all below the detection level. And you  
7 went through and looked at them and you found  
8 there were numbers of samples that were  
9 positive. Okay. I didn't look at the  
10 database but I can't -- it's amazing to me  
11 that we would have made that error. But --

12 DR. TAULBEE: Well, that's  
13 something that I think we should follow up on  
14 with Joyce's finding here. I, as well, find  
15 that -- but I'm not refuting that, you know,  
16 we might have made that error. I don't know  
17 at this time.

18 DR. NETON: But we know the  
19 detection was about .5 or something like that?  
20 Wasn't it? I forget what the number was but  
21 it was some value. And they were listed as --

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1 DR. LIPSZTEIN: .5 ppm per 1.5 mm.

2 DR. NETON: And you found samples  
3 that were listed like at 1.9. And --

4 DR. LIPSZTEIN: Yes.

5 CHAIRMAN GRIFFON: Was there any  
6 reason -- were they sensitive because they  
7 weren't from that location?

8 DR. NETON: That's what I was  
9 thinking. They were all from the 773 area.

10 CHAIRMAN GRIFFON: All from the  
11 773 area.

12 DR. NETON: Yes.

13 DR. MAKHIJANI: There were no  
14 bioassay samples that we found or that NIOSH  
15 found actually.

16 DR. TAULBEE: No, there was a lot  
17 of transference between 773 and 300. They're  
18 right next to each other.

19 CHAIRMAN GRIFFON: Okay, yes.

20 DR. TAULBEE: People would go  
21 between the two areas.

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1                   CHAIRMAN GRIFFON: All right.

2                   DR. NETON: I mean I read that  
3 last night myself. This report didn't come in  
4 too long ago so I did have a chance to read  
5 it. We certainly need to look at that.

6                   I would like to point out though  
7 that the main crux of the analysis is not the  
8 thorium bioassay samples here. It's the  
9 uranium bioassay samples that were used to  
10 establish what we believe to be a credible  
11 bounding value for the air concentrations in  
12 the area.

13                   So that analysis -- and I think it  
14 reads -- it's a little bit confusing when you  
15 read the addendum, in my opinion. But the air  
16 concentration data were just used to --  
17 validate is too strong a word but sort of  
18 compare and say were the processes, at least  
19 in that early time frame when we had bioassay  
20 data, did the processes generate from the  
21 bioassay information at least similar air

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1 concentrations.

2 But that was really just used to  
3 establish -- sort of an extra analysis to help  
4 validate the use of the uranium air bioassay  
5 samples. It wasn't necessarily -- but that  
6 analysis could stand alone without a thorium  
7 bioassay analysis.

8 DR. TAULBEE: And the other main  
9 reason that we didn't choose the thorium  
10 bioassay analysis was, as you pointed out, the  
11 limited time period. We knew the thorium work  
12 was starting much earlier. And extended up  
13 until 1965 with these different campaigns that  
14 we've identified.

15 And so for that very reason, we  
16 were looking for something to cover all of the  
17 time periods. That was why we went with  
18 uranium.

19 DR. LIPSZTEIN: But when you  
20 compare the uranium air concentration and  
21 everything was --

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1 DR. TAULBEE: Yes, yes, we  
2 understand.

3 DR. NETON: But really the method  
4 that is suggested here though uses bioassay  
5 samples that were taken all through 1964.  
6 That's the method that's proposed. Air  
7 samples are not used at all for anything in  
8 this --

9 CHAIRMAN GRIFFON: Uranium  
10 bioassays.

11 DR. NETON: Uranium bioassays.

12 DR. LIPSZTEIN: Yes, but when you  
13 have a thorium bioassay, why do you want to  
14 use uranium as a substitute?

15 DR. NETON: Because thorium  
16 bioassay is not very good, as you know.

17 DR. LIPSZTEIN: I don't know.  
18 It's written on your Technical Basis Document  
19 that it was very good and very carefully done.

20 DR. NETON: If that's all you  
21 have. But you only have the first two years,

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1 as you suggested. There's not enough to go  
2 out until 1965. And the fact is, as you know,  
3 the lower limit of detection, of course, for a  
4 missed dose for thorium bioassay puts you in a  
5 very high value, which is probably implausible  
6 in this particular scenario.

7 This is a fairly low air  
8 concentration operation. If you look -- the  
9 uranium bioassay suggests that the air  
10 concentrations were pretty low. And so to  
11 take a thorium bioassay sample and do a missed  
12 dose calculation based on non-detects and  
13 impute that the values could have been -- pick  
14 a number, ten, 20, 50 times higher, it just  
15 doesn't make sense to us. That's just -- it's  
16 sort of a --

17 DR. LIPSZTEIN: For me, I don't  
18 know. It doesn't -- I would -- for me it  
19 doesn't make sense to use uranium bioassay for  
20 thorium. We completed the radionuclides they  
21 were done in different places, done for

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1 different reasons.

2 DR. NETON: Well, we can talk  
3 about that.

4 DR. LIPSZTEIN: Yes, okay.

5 DR. NETON: I mean I think the  
6 crux of the issue here really --

7 DR. LIPSZTEIN: Okay, okay.

8 DR. NETON: Is the use of uranium  
9 bioassay as a surrogate for thorium bioassay.  
10 I think this whole other issue with the  
11 limited thorium bioassay --

12 CHAIRMAN GRIFFON: Well, that was  
13 in there, in the document, so they reviewed  
14 it. Yes.

15 DR. MAKHIJANI: There is a whole  
16 underlying rationale that led you to uranium  
17 bioassay

18 DR. NETON: Yes.

19 DR. MAKHIJANI: And we've reviewed  
20 all the pieces of that. So in this particular  
21 case, either the 773-A -- I've gone through

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1 the data sheets, too, in reviewing Joyce's  
2 report actually, since, you know, this is a  
3 pretty huge issue, I actually went through the  
4 data sheets myself.

5 First of all, we're not talking  
6 about everything being below the detection  
7 limit and that doses being so high that they  
8 are implausible. You've actually got results  
9 that are above the detection limit.

10 But there are people who were  
11 exposed to -- so if you believe the bioassay  
12 data and that the method was valid, you have  
13 people exposed to what you are saying is above  
14 some plausible limit, which can't be right.

15 So either the bioassay data were  
16 not properly done or people were exposed to  
17 pretty high levels.

18 DR. NETON: That's a good point.  
19 And we have to investigate why we didn't pick  
20 up on the fact that there were positive  
21 bioassay samples.

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1 I think I have an idea of why that  
2 happened is because you had two expert  
3 interviews in which they gave an opinion that  
4 probably all the bioassays were below. That  
5 may be where it came from. But that's the  
6 only reason that I've seen.

7 The other thing is either the 773  
8 bioassays were done for workers who were in  
9 773 or they were done for workers who went  
10 from 773 to 300. Now there is no indication  
11 in the log sheets, in the bioassay sheets that  
12 that happened. If we have got log sheets that  
13 are inaccurate in terms of location, that  
14 would throw a lot of things into question  
15 because --

16 DR. MAKHIJANI: Wait a minute, let  
17 me finish -- because there is no notation in  
18 the log sheets that says that these workers  
19 were transferred. I know it is in one of your  
20 interviews that workers went from 773 to 300-M  
21 and the interviewees were pretty senior

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1 knowledgeable people but they weren't involved  
2 in 300-M directly that I could tell.

3 But if the log sheets are  
4 inaccurate, I think, in terms of the location  
5 of the bioassay samples, I think it would open  
6 up some very large questions as to whether you  
7 can rely on any description in the log sheets  
8 as to whether the workers were actually  
9 present because there is not a single location  
10 in that entire set of bioassay data that those  
11 workers were anywhere else that I found.

12 Did you see anything, Joyce --

13 DR. LIPSZTEIN: No. As I went  
14 through -- 90 percent of the workers, I went  
15 to their personnel files. And all of them  
16 were in 773-A.

17 CHAIRMAN GRIFFON: And the other  
18 point you make is there is some production in  
19 773.

20 DR. MAKHIJANI: Yes.

21 DR. LIPSZTEIN: Yes.

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1 DR. MAKHIJANI: There was  
2 reprocessing type --

3 DR. LIPSZTEIN: And there was some  
4 special work permits to go there and work  
5 there also.

6 CHAIRMAN GRIFFON: Let Tim  
7 respond.

8 DR. TAULBEE: When you went  
9 through the individual files and you were  
10 looking -- and I concur with you, Arjun,  
11 actually, that the thorium bioassay results  
12 all say 773. But when you look at the  
13 individual bioassay cards of an individual,  
14 you'll see 773. You will also see M area for  
15 around the same time period for many of the  
16 people. Not all of them but many of those  
17 people.

18 So that's where I -- to me that  
19 gave some confirmation to what we heard during  
20 the interviews that people were moving back  
21 and forth between the two. It's not -- I

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1 agree with you. All of the thorium samples  
2 say 773 beside them. But if you look at the  
3 individual bioassay cards, you'll see M area  
4 next to them or 300 as well around that same  
5 time period, showing the transference between  
6 them.

7 DR. MAKHIJANI: Yes. I didn't  
8 look at all the bioassay cards. Joyce did.

9 DR. LIPSZTEIN: I did. I did. I  
10 went through every one of them. And they were  
11 773-A.

12 DR. TAULBEE: For thorium.

13 DR. LIPSZTEIN: Yes. And there  
14 were some uranium samples, bioassay samples  
15 also for the same people. Some in the same  
16 month, some in other dates. But all the  
17 thorium data, the location was 773-A. All the  
18 thorium samples had this location, 773-A.

19 DR. TAULBEE: That's correct. I'm  
20 not refuting that. I'm just talking about the  
21 transference, when you look at their other

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1 uranium bioassay, you'll see in the -

2 DR. LIPSZTEIN: Yes, but some of  
3 the uranium bioassay were not done on the same  
4 day.

5 DR. TAULBEE: Well, yes,  
6 absolutely not.

7 DR. LIPSZTEIN: But some were done  
8 the same -- some of them but not all of them.  
9 But, of course, it's not -- I wouldn't  
10 compare both biosamples because the intake is  
11 different in the body. So they don't compare.

12 CHAIRMAN GRIFFON: But when you --  
13 I'm just trying to understand the comparison.  
14 When you compare the air sampling data to the  
15 thorium urinalysis data, the air sampling was  
16 M area sampling, right?

17 DR. TAULBEE: That's right.

18 CHAIRMAN GRIFFON: So I guess  
19 that's where this comes into play is if you're  
20 making -- even though you're using -- the  
21 ultimate result is they were using uranium

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1 data.

2 DR. TAULBEE: When we compared the  
3 M area results for air sample, we compared  
4 both M area to M area. Yes, we did compare  
5 them to the thorium bioassay. And so I  
6 understand.

7 CHAIRMAN GRIFFON: You compared M  
8 area to uranium -- uranium M area. But this  
9 issue is the thorium. And you might be  
10 comparing apples and oranges. You might be.

11 DR. TAULBEE: That's right. Can I  
12 actually give you just a little bit of  
13 background that maybe wasn't in the ER as far  
14 as explaining the operation. It might help  
15 you understand what was going on there at the  
16 time between the uranium and the thorium.

17 The thorium work at this time was  
18 to make uranium-233 initially. And so their  
19 process was to receive thorium slugs that had  
20 already been rolled and cut and partially  
21 canned from Sylvania. This was the same

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1 process that they did for uranium. They  
2 received them from Sylvania.

3 And their job was to finish the  
4 slug. They would weld on an end cap and then  
5 they would go through pressure testing of it  
6 to make sure that it wouldn't fail. And so  
7 that was their process. It was the same for  
8 thorium as it was for uranium.

9 This is why we feel that the  
10 uranium bioassay is a good substitute or  
11 surrogate when you use the mass basis because  
12 the same process was going on for the uranium  
13 slugs as in the thorium slugs in the 300 area.

14 Now I did notice in Item No. 3,  
15 Finding No. 3, that you identified other  
16 areas, which I do think we should potentially  
17 look at a little closer. But for the 300  
18 area, the work was effectively identical  
19 between uranium and thorium. It was taking  
20 this partially canned slug and finishing it.

21 This is why we feel the uranium

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1 air concentrations that would result in an  
2 intake and result in the uranium bioassay are  
3 a good surrogate for what those thorium  
4 exposures would be, especially when you  
5 consider the limited thorium work that was  
6 conducted due to the campaign.

7 So that was our methodology. And  
8 that was why we went through that.

9 Now when you get into the  
10 dissolution, which, you know, as you mentioned  
11 in Finding No. 3, there are some, you know,  
12 difficulties with that. One of the questions  
13 that I have for Finding No. 3 --

14 DR. MAKHIJANI: I have some  
15 comments on Finding No. 2, first of all.

16 DR. TAULBEE: Okay. I'm sorry.

17 DR. MAKHIJANI: There are two  
18 possibilities. Either the thorium bioassay  
19 data were associated with 773 or they were  
20 associated with 300-M. From everything we  
21 know, they were associated with 773. So in

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1 that case, the air concentration comparison,  
2 it doesn't have any technical basis.

3 But if you say they were  
4 associated with 300-M because workers were  
5 being transferred, then the question would be  
6 why would you reject -- even if the thorium  
7 bioassay data are very limited, clearly they  
8 indicate much, much higher exposures than what  
9 you get in the method that you proposed.

10 So if the idea is to come up with  
11 a bounding dose, even the limited -- it may  
12 not be the bounding dose but certainly the  
13 dose that you've calculated is much less than  
14 the dose that can be imputed from the bioassay  
15 data that are available if you say they were  
16 taken in the 300-M area.

17 DR. NETON: I would agree with you  
18 if there are truly values above the detection.

19 DR. MAKHIJANI: Yes, there are.

20 DR. NETON: I would say if one had  
21 a set of 50 or 250 measurements that were all

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1 below the detection limit of the method, that  
2 brings in a question is that really a valid  
3 bounding -- that bounding approach.

4 DR. MAKHIJANI: Yes, I agree with  
5 that.

6 DR. NETON: I mean it just says  
7 that the sensitivity of thorium bioassay is  
8 pretty darn poor for predicting intakes.

9 DR. MAKHIJANI: Right.

10 DR. NETON: And that's why -- I  
11 have to look at it as well but I'm pretty sure  
12 that's why we rejected its use even in the  
13 early years. But we need to go back and look  
14 at this. This seems to be --

15 CHAIRMAN GRIFFON: Well, I also  
16 have a novel idea that maybe when we take our  
17 first break, we all are tied to the O: drive  
18 and we have our experts here, why can't we  
19 pull up the data and look at it. It is a  
20 Working Group. And let's resolve this. I  
21 move the ball, you know.

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1 DR. NETON: I have not reviewed  
2 that data in quite some time actually.

3 CHAIRMAN GRIFFON: So, okay, we'll  
4 do that at a break.

5 DR. NETON: Is the data in one  
6 location now?

7 DR. MAKHIJANI: Joyce has it all.

8 DR. NETON: Okay, you have it all?

9 DR. LIPSZTEIN: Yes, I do.

10 CHAIRMAN GRIFFON: Great.

11 DR. NETON: It just really  
12 surprises me that we would miss something. I  
13 don't think we would have jumped to a  
14 conclusion based on worker testimony.

15 DR. TAULBEE: Mike, can you  
16 identify the SRDB number for those thorium log  
17 books.

18 DR. NETON: I think be that as it  
19 may -- I mean Arjun has a very good point, if  
20 the data are positive and they shower higher  
21 intakes and they were taken in the 300 --

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1 CHAIRMAN GRIFFON: 773-A.

2 DR. LIPSZTEIN: It says it was  
3 773-A.

4 DR. NETON: Which brings me to the  
5 next question, I guess. Why -- what was going  
6 on in 773 that was creating these -- if these  
7 really, truly are high --

8 CHAIRMAN GRIFFON: Right.

9 DR. NETON: What was going on  
10 there that created these -

11 CHAIRMAN GRIFFON: They did  
12 discuss some operations, right?

13 DR. NETON: Yes, separation.

14 CHAIRMAN GRIFFON: And that was  
15 going on apparently in 1954 and '55.

16 DR. TAULBEE: Well, in 1954 -- and  
17 this gets to Finding 3 -- are we --

18 CHAIRMAN GRIFFON: Yes, let's go  
19 on to that.

20 DR. TAULBEE: One of the  
21 operations was there was a test -- there was a

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1       cave    experiment   --   a   high   level   cave  
2       experiment where one thorium slug was cut into  
3       five pieces.   So it was cut and it was so it  
4       could be dissolved in a laboratory.

5                   Now this is one slug.   In the 300  
6       area, we're looking at 300 to thousands of  
7       slugs being handled and processed and not cut.

8       But this one was cut.   So this is -- you  
9       know, we've got air sampling where they would  
10      occasionally lay some of the thorium in.   So  
11      that was going on in the 300 area as well.

12                   CHAIRMAN GRIFFON:   Well, I'd like  
13      to understand that a little better because  
14      I've done this path on other sites before.   It  
15      has always been one slug.   I mean --

16                   DR.   TAULBEE:       Well, that's a  
17      question mark.

18                   CHAIRMAN GRIFFON:   I mean yes, the  
19      bullet point here it says the cave where  
20      thorium slugs were dissolved.   I mean is that  
21      -- I mean you might have found about one

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1 document of one. I'm just -- that would be an  
2 open question.

3 DR. TAULBEE: And that's where I  
4 was going to with this --

5 CHAIRMAN GRIFFON: Yes, oh, okay,  
6 all right.

7 DR. TAULBEE: Was with the -- you  
8 know, this is the one -- this is one of them  
9 that causes me some pause of was there more  
10 work going on than what we were -- then we  
11 knew about in this time period. And you may  
12 have identified something here that we missed,  
13 you know, quite possibly here.

14 But from what we had previously  
15 seen, these were -- it was a small-level type  
16 of experiment. It was, you know, like one  
17 slug type of scenario here. We also know that  
18 there was some metallography work that was  
19 going on, there was some polishing to look at  
20 the metal fractures and what could happen  
21 during canning. And so we know some of that

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1 work was going on there in the 773 as well.

2 Now if this 1954 initial  
3 laboratory dissolving turned into a larger  
4 experiment in 1956, that might explain the  
5 thorium bioassay that we see. And so this  
6 could be something that we've missed. And,  
7 you know, I'm willing to take the action to go  
8 back to the site and look and see what there  
9 something going on in 1956 with regard to 773  
10 that would result in all of these thorium  
11 bioassay.

12 So I think you have identified  
13 something in Finding No. 3 here. That, you  
14 know, I think that we should go look at a  
15 little closer.

16 With regard to the 300 area, I  
17 don't think it changes that model. It might  
18 change what we estimate for the design.

19 CHAIRMAN GRIFFON: Let me ask a  
20 question. I guess my broader question on  
21 issue 3, and we didn't let Joyce introduce it,

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1 which I guess we should have done --

2 DR. TAULBEE: I'm sorry.

3 CHAIRMAN GRIFFON: That's okay but  
4 I mean it says a number of other areas that  
5 you could at least identify. And so, you  
6 know, are these more than experimental kind of  
7 quantities or, you know, what?

8 DR. TAULBEE: The 773 and then the  
9 TMX are the two that Joyce identified that  
10 caused me some pause, some concern. Actually  
11 the last bullet there, the 723-A, I need to  
12 look at that SWP as well -- but one of the  
13 things I would like to talk about for the 200  
14 area, the large scale separation of U-233,  
15 that doesn't cause me any concern.

16 And the reason is is that the  
17 product for that big dissolution experiment --  
18 or not experiment -- campaign, was to extract  
19 uranium-233. So just like when plutonium is  
20 extracted from uranium fuel rods, irradiated  
21 fuel rods, the three streams are effectively

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1 created: the plutonium stream, the uranium  
2 stream, and then the mixed fission product  
3 stream. And the mixed fission products go out  
4 to the tank farms.

5 For this particular campaign in  
6 1964, uranium-233 was the primary product.  
7 And this first campaign was before they  
8 started separating out the thorium from the  
9 mixed fission products. So all of the thorium  
10 byproduct and mixed fission products all went  
11 directly out to the tank farms. So there was  
12 no potential for human contact from that large  
13 campaign in 1964.

14 That changed in 1965 and '66 and  
15 subsequent years when they actually developed  
16 a method to extract and separate the thorium,  
17 separate from the U-233 and the fixed fission  
18 products. So for this particular time period,  
19 that large dissolution doesn't cause me any  
20 concern because it went directly into the  
21 waste tank -- the tank place -- the tank

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1 farms.

2 But in latter years, I understand,  
3 you know, that that might not be the same.  
4 There was a thorium nitrate that was pumped  
5 directly into rail cars and then sent back to  
6 Fernald as a nitrate. So the only potential  
7 for exposure would be the pumping into the  
8 rail cars from the canyons from those  
9 campaigns.

10 But in this first campaign in  
11 1964, it went straight to the tanks.

12 DR. LIPSZTEIN: But anyway, there  
13 are so many areas that have thorium work and  
14 the analysis was done only for the 300 area.

15 CHAIRMAN GRIFFON: I mean the only  
16 other point that I would have to make about  
17 this -- the other areas -- I mean you've  
18 brought up and this is sort of a question but  
19 I mean I thought that all these documents that  
20 SC&A is reviewing are from the O: drive,  
21 right?

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1 DR. TAULBEE: Yes.

2 CHAIRMAN GRIFFON: So there would  
3 have been --

4 DR. TAULBEE: Right.

5 CHAIRMAN GRIFFON: Documents that  
6 NIOSH identified -- found -- you know used to  
7 develop the ER. And yet you're acting  
8 surprised that, you know, this is an area we  
9 need to look into.

10 I guess that is a little  
11 concerning, you know, that you guys authored  
12 this and, you know, this is your source  
13 documents. And it's just SC&A reviewing  
14 these. So it's a little -- I mean I guess it  
15 is a little concerning this far along in the  
16 process that -- you know they didn't get these  
17 from interviews or anything, right?

18 DR. MAKHIJANI: At least when I  
19 reviewed Joyce's paper, I just did a search  
20 for -- a search term for thorium.

21 CHAIRMAN GRIFFON: Anyway, that's

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1 just, you know --

2 DR. MAKHIJANI: Is that what you  
3 did, Joyce?

4 DR. LIPSZTEIN: Yes, I looked for  
5 thorium.

6 DR. MAKHIJANI: And so I mean a  
7 number of documents came up. You had to sort  
8 them through.

9 CHAIRMAN GRIFFON: Just more of a  
10 comment than a question.

11 DR. MAKHIJANI: The question of  
12 the high level caves, it was not one slug. We  
13 have cited a 1961 document from -- I don't  
14 know how it is pronounced, the name, here's  
15 what it says:

16 Sections from three thorium slugs  
17 will be dissolved in the high level cave. So  
18 this is a 1961 document. We're not talking  
19 about 1954 or '55.

20 DR. NETON: You know we're talking  
21 three slugs in this one, correct?

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1 DR. MAKHIJANI: Yes, right. So  
2 now what we've said, the caveat to finding  
3 three is we can make an attempt to develop the  
4 thorium source term at Savannah River site.  
5 What -- Joyce sent me a list. I verified the  
6 list. I did my own search. I found a couple  
7 more things. And I thought that we really  
8 should stop there, not make a giant project  
9 out of it because it looked like it could be.

10 And we gave you some citations --  
11 I think -- I believe -- they are all  
12 essentially all -- other than some NIOSH  
13 documents, all the citations are from the  
14 SRDB.

15 As regards -- well, let me just  
16 leave it there.

17 CHAIRMAN GRIFFON: Well, let's go  
18 past finding three then for now. Let's just  
19 get through the rest of the report, I think.  
20 And then we'll take a break and you can look  
21 at those.

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1 DR. MAKHIJANI: Oh, the one thing  
2 I want to say about the high-level waste tank  
3 farm is we've sent a separate report out on  
4 the incidents on Finding 12, when we come to  
5 it. But it's not that the high level -- the  
6 waste tank farm did not have exposure  
7 potential. There have been plenty of exposure  
8 potential that has been documented and plenty  
9 of exposures that are documented in the tank  
10 farm.

11 Thorium residues also, I believe,  
12 if I'm not mistaken, or material waste from  
13 thorium was also sent to the burning grounds.

14 And I know we all have separate action items  
15 in there and bins, but I think it is relevant  
16 here that thorium was in these various places.

17 And I don't believe -- and we have evidence  
18 from other matrix items that there was not  
19 only exposure potential but there were  
20 exposures in these other areas, including  
21 high-level waste tank farms and burning

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1 grounds where thorium was handled.

2 DR. TAULBEE: If you have  
3 information on where thorium was handled in  
4 the burning grounds, I'd like to see that.

5 DR. MAKHIJANI: I believe that we  
6 may have cited some although, you know, I  
7 don't remember exactly right now. But there  
8 may be a document. Burning ground was --

9 DR. TAULBEE: 643 or 42.

10 DR. MAKHIJANI: I believe there is  
11 -- I believe there is an explicit reference to  
12 643-G in Finding 3. Let me just find -- let  
13 me just look at it right now.

14 CHAIRMAN GRIFFON: Well, your last  
15 one says irradiated thorium waste was  
16 processed in the 643-G.

17 DR. MAKHIJANI: Yes, that's where.

18 MR. MAHATHY: But not necessary  
19 burned.

20 CHAIRMAN GRIFFON: Processed it  
21 says.

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1 MR. MAHATHY: Right.

2 DR. MAKHIJANI: Yes, processed --  
3 a lot of the -- now we haven't tracked all  
4 this stuff to the last -- you know, what the  
5 exposures were. A lot of the process with the  
6 burning grounds, to the extent that I  
7 understand it, was material was often taken  
8 there and put in tanks. And then it was  
9 burned later. So you won't find necessarily  
10 the same document telling you ultimately what  
11 happened with the stuff.

12 And I don't believe that actually  
13 the records of burning are complete because --

14 CHAIRMAN GRIFFON: But is that --  
15 you think that is your reference though?

16 DR. MAKHIJANI: The 643-G is a  
17 reference to the burning ground. It may not  
18 show --

19 CHAIRMAN GRIFFON: Right.

20 DR. MAKHIJANI: That the stuff was  
21 burned there. And I believe that the burning

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1 ground -- there is a document on the burning  
2 ground. Burning was stopped in 1971 or '72 on  
3 orders under the Nixon administration. And,  
4 you know, pursuant to the clean air stuff that  
5 was going on at the time.

6 And I think there was a later  
7 report that indicated that the burning ground  
8 records as to what was burned there were not  
9 complete. But I can dig that up for you --

10 CHAIRMAN GRIFFON: Okay.

11 DR. MAKHIJANI: Separately.

12 CHAIRMAN GRIFFON: All right. So  
13 then why don't we go on to Finding 4?, just to  
14 run through all these. Guide for us if you  
15 want to give us the overview.

16 DR. LIPSZTEIN: And now we go to  
17 the comparison of air and thorium  
18 reconstruction recommendations.

19 CHAIRMAN GRIFFON: Yes.

20 DR. LIPSZTEIN: Okay. The reason  
21 if we go now to area 300, there is a

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1 comparison of the air concentrations. The  
2 comparison of air concentrations, they were --  
3 well, they were also compared for a limited  
4 time period, the comparison of the thorium  
5 concentration with the air concentrations, so  
6 have the same problem of the limited time  
7 period.

8 And the second thing that I don't  
9 think it is accessible is that you are  
10 comparing air concentrations done with  
11 different types of instruments. It was not  
12 the same air sample that was used for uranium  
13 with the air and the air sample that I was  
14 used for time was a different instrument, it  
15 was not the same one.

16 And they were taken in different  
17 locations. The uranium air sample was a  
18 standard place and the thorium air sample from  
19 the description were put in a place where it  
20 would be comparable with the -- to the  
21 inhalation of the worker although it was not a

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1 personal air sample. It was an air sample  
2 that was located at the height of the worker.

3 So you are comparing two different  
4 air samples in two different locations. And  
5 comparing the results for the intake. So that  
6 doesn't -- you know, you are comparing  
7 different things.

8 So you cannot say that one was  
9 higher than the other one. Actually if you  
10 looked closely at the results you got, the  
11 thorium results are higher than the uranium  
12 results. And so -- but although we went into  
13 this statistical problem of comparing the  
14 results and saying well, your conclusions are  
15 not statistically correct, I think that there  
16 are things that are even more limiting that,  
17 you know, that the statistical conclusion  
18 because you couldn't compare two different  
19 things.

20 And also you are comparing a  
21 limited time air samples from a limited period

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1 to a longer period as if the situation was the  
2 same for all the periods of time. So you are  
3 comparing different things in different time  
4 periods. And the statistical doesn't match.  
5 So it's -- we don't agree with the overall  
6 conclusions on the comparisons of air samples.

7 DR. MAKHIJANI: Just a small  
8 supplement to what Joyce said. We don't  
9 disagree with the statistical test that was  
10 done. The two means are equal. It's just  
11 that there are so few data that you could do a  
12 different statistical test and say that the  
13 thorium mean is bigger than the uranium mean.  
14 And that passes the test, too, you accept  
15 that in all hypotheses.

16 And the thing that is very  
17 striking is that essentially all the points  
18 for air concentration that are above the  
19 median for thorium are bigger than the uranium  
20 air samples. So the core of what Joyce said  
21 is correct.

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1 I mean there are a number of  
2 points of comparison where --

3 CHAIRMAN GRIFFON: Those are your  
4 --

5 DR. MAKHIJANI: Yes, yes -- if you  
6 will want to claimant-favorable, you would  
7 never use -- you would never conclude that the  
8 uranium air sample was --

9 CHAIRMAN GRIFFON: Can I -- just  
10 one fundamental question before Tim responds.  
11 But is there a sampling? Are we even  
12 comparing air sampling -- I mean do we know  
13 that they are from the same building? That's  
14 a fundamental question I have because I  
15 thought there was some question whether the  
16 air sampling in '54 or '55 or whatever for the  
17 thorium were in 773. Are they -- you're sure  
18 they're in the same -- we're comparing apples  
19 to apples in that regard, right?

20 DR. TAULBEE: Yes, the thorium  
21 were in the 320-M and 313-M.

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1                   CHAIRMAN GRIFFON:     Okay.     Just  
2     wanted to clarify that.

3                   DR. TAULBEE:     And the uranium were  
4     in --

5                   CHAIRMAN GRIFFON:             So     the  
6     urinalysis data from before that were --

7                   DR. TAULBEE:     That's correct.

8                   CHAIRMAN GRIFFON:     In question --  
9     okay, so these are definitely -- all right.

10                  DR. LIPSZTEIN:            But     they     were  
11     taken with different --

12                  CHAIRMAN GRIFFON:     Right.     I got  
13     the rest of it.     I just wanted to make sure.

14                  DR. LIPSZTEIN:     And also they were  
15     compared from `54 and `55 and extrapolated to  
16     `65.

17                  CHAIRMAN GRIFFON:     Right.

18                  DR. TAULBEE:     Well, again, let me  
19     emphasize that this was not used for dose  
20     reconstruction or for our model.     It was  
21     simply done for comparison of during the

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1 thorium work, were the air samples much, much  
2 higher than the uranium air samples during  
3 similar work.

4 The thorium samples, if you'll  
5 notice where the location was, was typically  
6 closer to where you would expect higher  
7 concentrations -- during swaging operations or  
8 cutting -- I'm sorry, cutting and machining of  
9 rods, grinding, and then -- but most of the  
10 uranium ones that we had readily access  
11 available to were for normal operations.

12 Or there are some of these for  
13 cutting and polishing metal, just like the  
14 thorium. And so our goal was to compare --  
15 all right, we have normal uranium operations  
16 that are going on. And now we have got these  
17 campaigns with thorium. Do we see a much  
18 higher increase in air concentrations that  
19 would lead us to conclude that we can't use  
20 the uranium bioassay? And we didn't see that.

21 Now we did the mean tests. And

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1 the mean tests came up as inconclusive. Now  
2 you did point out that the higher air samples  
3 for thorium were higher than uranium when you  
4 get above the mean. But you would expect that  
5 with these different types of operations as  
6 you pointed out the differences.

7 But we're not seeing a very --  
8 we're not seeing huge differences and -- that  
9 would lead at least me to conclude that we  
10 couldn't use the uranium bioassay.

11 DR. LIPSZTEIN: The problem is the  
12 thorium. If you have, you know, a small  
13 intake of thorium, this leads to a very high  
14 dose. So one of the problems with using  
15 actually air concentration to derive the dose  
16 is that there is a lot of uncertainties in  
17 using air concentrations of air intake.  
18 Sometimes you don't have any other options.

19 And I would agree. If the thorium  
20 air concentration was used to derive thorium  
21 intake, it's one thing. To use the uranium

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1 air concentrations to derive the thorium air -  
2 -

3 DR. NETON: That wasn't done,  
4 though, Joyce. See that --

5 DR. LIPSZTEIN: No, you used the  
6 bioassay derived --

7 DR. NETON: Exactly, which is very  
8 different. That's -- using the people as  
9 almost like an air sampler because they  
10 integrate the intake over time. So you come  
11 up with what is the air concentration of  
12 uranium for that process.

13 And as Tim said, the process used  
14 were identical. They were putting an end cap  
15 on a piece of thorium that had already been  
16 canned. Exactly the same process.

17 The whole point of this other  
18 comparison was to say given that these were  
19 similar processes, can we at least get some  
20 level of confidence that the air samples are  
21 not inconsistent with each other -- to just

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1 sort of give us a good sense to say -- because  
2 we were open to the fact that you could say  
3 well, how do you know thorium behaved just  
4 like uranium even though it was exactly the  
5 same process?

6 Well, they went and got some air  
7 sample data that tends to provide credence to  
8 that fact, that they are not that different.  
9 Then you go and you say okay, what were the  
10 air concentrations during the thorium canning  
11 operations or uranium canning operations based  
12 on all these annual bioassays. And you come  
13 up with a bounding intake.

14 That intake gives you an air  
15 concentration. You say why would you believe  
16 that the thorium air concentrations were much  
17 higher than that? That's the whole crux of  
18 the argument. That's all we're saying.

19 DR. LIPSZTEIN: Because you don't  
20 know. That's why. You don't know.

21 DR. NETON: Do you think we know

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1 what the air concentrations were for uranium?

2 I mean given the uranium bioassay data we  
3 have, do you think we can adequately establish  
4 bounding air concentrations for uranium in the  
5 air -- in the uranium canning operations?

6 DR. LIPSZTEIN: I don't know. I  
7 don't know.

8 DR. NETON: Well, that's central  
9 to this discussion. I mean --

10 DR. LIPSZTEIN: No, no, I don't  
11 know, I don't know, I don't know because you  
12 are not talking about bounding the uranium  
13 concentrations, you are talking about bounding  
14 thorium concentrations. And I think you don't  
15 know anything about the thorium concentration  
16 given the uranium bioassay results.

17 DR. NETON: Why is that?

18 DR. LIPSZTEIN: Because first you  
19 are trying to justify it saying that the air  
20 concentrations of thorium were similar to the  
21 air concentrations of uranium in that area.

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1 And I don't think you have proven that. I  
2 don't think it is proved.

3 On the contrary, I think it is  
4 proved that the thorium air concentrations  
5 were higher than the uranium air  
6 concentrations in many times. Second, that we  
7 don't know what's happening. Third, when you  
8 compare the air concentrations in two  
9 different locations, the instruments given  
10 into -- it's a lot of uncertainties around  
11 something that has different scores than this.

12 So -- and so I don't think it's --  
13 you know anything about thorium given that you  
14 know the bioassay and the bioassay was done by  
15 fluorimetry. So if you had -- so it is only  
16 good for natural uranium. If you had a -- if  
17 you had higher uranium-235, you can see it  
18 from the bioassay. There's a lot of  
19 uncertainties around that unless you know how  
20 much it was and which.

21 DR. NETON: Well, we know how much

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1 mass of uranium was in the air.

2 DR. LIPSZTEIN: Yes, but --

3 DR. NETON: And now we're saying

4 that mass -- that is a mass generation issue.

5 You're generating a mass concentration.

6 DR. LIPSZTEIN: Yes.

7 DR. NETON: Given that mass  
8 concentration, if it were thorium, what would  
9 be the thorium activity concentration? That's  
10 all we're saying. It's very simple.

11 DR. LIPSZTEIN: Yes, but it's not  
12 the same.

13 DR. NETON: I don't know why it's  
14 not the same.

15 DR. LIPSZTEIN: It's not the same.

16 You didn't prove that the air concentration  
17 of both of them could be --

18 DR. NETON: We've proven that  
19 they're not inconsistent with each other.

20 DR. LIPSZTEIN: No.

21 DR. NETON: And, you know, let's

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1 forget about the air concentration data all  
2 together. And let's say we had no air  
3 concentration data.

4 And we have identified that the  
5 process is identical. It's a can. It had a  
6 covering on it. And they're trying to close  
7 one end of the can. The operation is  
8 identical. They're welding the cap on.

9 You have uranium in one case,  
10 thorium in the other. I'm having trouble  
11 understanding what mechanisms are different  
12 that that would not allow you to infer --

13 DR. LIPSZTEIN: I don't know.

14 DR. NETON: What the air  
15 concentrations would be.

16 DR. LIPSZTEIN: I don't know. But  
17 you don't know. That's it. You don't know.  
18 You don't know --

19 DR. NETON: If we knew, we would  
20 use the values.

21 DR. LIPSZTEIN: Yes, so you don't

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1 know it so you don't know. You are trying to  
2 infer something from one operation to another  
3 operation.

4 DR. NETON: Well, I'd like to hear  
5 your points on why they're not the same. Why  
6 they would be different. I mean you have some  
7 scientific reasoning why they would be  
8 different. I think you owe us that type of an  
9 explanation.

10 DR. MAKHIJANI: We reviewed what's  
11 in your addendum. In your addendum, you used  
12 comparisons of air concentrations to establish  
13 the scientific reasonableness of using uranium  
14 bioassay data for thorium intake. That's what  
15 you did.

16 So if we focus on the air  
17 concentration data, first of all, they're for  
18 a limited period. You should establish this  
19 plausibility over the period of time for which  
20 we're talking about. I don't know whether  
21 there are thorium air concentrations -- are

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1       there thorium air concentration data for the  
2       period?

3                       DR. NETON:    No.

4                       DR. MAKHIJANI:       There aren't.  
5       Okay.  If you look at Figure 3 in the report  
6       that we gave you, and look at the values above  
7       the mean, there are lots of places where the  
8       thorium air concentration are factors of two  
9       or three -- uranium air concentrations.  
10      Several intakes that's a factor of two or  
11      three bigger for thorium.  You'll have a bone  
12      dose,  For the same mass, you'll have a bone  
13      dose that is 200 -- 150, 200 times bigger.

14                      And so what I think to say one of  
15      the central objections very clearly is that a  
16      small error in transferring from uranium to  
17      thorium for certain organs -- certainly not  
18      all organs but for certain organs, especially  
19      bone dose, will produce orders of magnitude  
20      error in the dose estimate.

21                      And this is one of the central

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1 problems in this whole analogy is that in this  
2 method, you cannot tolerate even small errors  
3 in the mass because you're talking -- you're  
4 talking very large errors in the dose for the  
5 bone surface.

6 And I don't think that the method  
7 of comparisons for establishing the  
8 plausibility of using uranium bioassay data,  
9 as you have used the air concentration, just  
10 holds up. The period is too limited. The  
11 data for thorium don't indicate that they are  
12 less.

13 If the thorium data were an order  
14 of magnitude less than the uranium data  
15 uniformly, especially at the higher ends, I  
16 think you could possibly -- you know you could  
17 possibly start down that line of argument.  
18 But as it is, I don't think you have -- there  
19 is a case here.

20 DR. TAULBEE: Again, our goal was  
21 to see if they were comparable. And we

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1 thought that they were.

2 You're raising the issue that they  
3 are not comparable because of the upper tail  
4 of the thorium. I'd like to point out again  
5 that the air sample data that we used was  
6 mostly from normal operations for the uranium.

7 We can go through and extract the  
8 uranium data that is similar and just select  
9 the same types and do a match of one to one of  
10 cutting or so forth with uranium and we can  
11 re-compare those two datasets if you want.

12 CHAIRMAN GRIFFON: When you say  
13 normal operations, I thought the operations  
14 were exactly the same. Are you saying that  
15 they were wearing them eight hours a day or --

16 DR. TAULBEE: No, no, these aren't  
17 lapel. These aren't lapel.

18 CHAIRMAN GRIFFON: None of them?

19 DR. TAULBEE: None of them are  
20 lapel. If you look at the Appendix of our ER  
21 Report, we've got a table that shows the

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1 location of where these air samples are. And  
2 you'll see that for most of the uranium, it  
3 was normal operation.

4 We quickly made the comparison,  
5 meaning canning, which is --

6 CHAIRMAN GRIFFON: Which is -- Jim  
7 was making the argument that --

8 DR. TAULBEE: Right.

9 CHAIRMAN GRIFFON: Canning is  
10 canning. It doesn't matter whether it was  
11 thorium or uranium.

12 DR. TAULBEE: Right. If you look  
13 at a lot of the thorium ones -- thorium air  
14 samples, it is cutting, machining rods from  
15 the standpoint of a rod -- basically it might  
16 be extruding some from the tip. And so they  
17 couldn't weld the end cap on. So they have to  
18 machine it down a little bit.

19 The same thing they would have to  
20 do with uranium during their canning  
21 operations. There's periods of time when it

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1 wouldn't quite fit and you would have to  
2 machine it a little bit.

3 CHAIRMAN GRIFFON: Well, I didn't  
4 hear that in the description of the process  
5 before. Okay, okay.

6 DR. TAULBEE: But they had to do  
7 it with uranium and they had to do it with  
8 thorium.

9 CHAIRMAN GRIFFON: Right. All  
10 right.

11 DR. TAULBEE: So that's where  
12 we're saying they are the same process. They  
13 continued to take more uranium samples -- or  
14 more thorium samples when they were doing  
15 these particular operations. And that's the  
16 data that we put in here.

17 CHAIRMAN GRIFFON: Yes.

18 DR. TAULBEE: Now we can go  
19 through the uranium -- or the air sample log  
20 sheets are all the same -- and extract one to  
21 get rid of all these normal operations and

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1 look for ones that are similar --

2 CHAIRMAN GRIFFON: In description.

3 DR. TAULBEE: To the thorium ones

4 --

5 CHAIRMAN GRIFFON: Got it.

6 DR. TAULBEE: And re-plot them.

7 CHAIRMAN GRIFFON: I understand.

8 DR. TAULBEE: And I think that gap

9 that you see there will diminish greatly.

10 DR. MAKHIJANI: So if you look at

11 the charts in Figure 3, one would presume that

12 based on the reasoning you just stated, that

13 the higher end uranium samples would

14 correspond to the special operations. And you

15 see that all of the higher end uranium samples

16 are lower than the thorium samples. They're

17 all lower. There isn't a single point in the

18 higher end of uranium samples that is bigger

19 than the thorium among the datasets that you

20 have presented.

21 DR. TAULBEE: That's correct. But

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1 I think that that's -

2 DR. NETON: I think if we went  
3 back and compared apples --

4 DR. TAULBEE: Apples to apples.

5 DR. NETON: See in our opinion,  
6 they demonstrated they were not inconsistent  
7 with each other.

8 DR. TAULBEE: Right.

9 DR. NETON: You raise a point that  
10 the upper tail are different. I think if we  
11 went back and looked at similar operations and  
12 compared them, we would probably get the value  
13 that, you know, you are looking for, which was  
14 a more appropriate one-to-one correspondence.

15 CHAIRMAN GRIFFON: But isn't Arjun  
16 making the argument that even on the tail, if  
17 you look at the individual data points, none  
18 of them --

19 DR. NETON: Well, I think the  
20 uranium ones are largely all normal  
21 operations.

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1                   CHAIRMAN GRIFFON:     But shouldn't  
2     you see some of those individual data points  
3     above or at least equal to?

4                   DR. TAULBEE:       Well, these are  
5     ordered statistics. These aren't --

6                   CHAIRMAN GRIFFON:    Yes, okay.

7                   DR. TAULBEE:     So if you've got a  
8     higher percentage that are normal operations,  
9     then you are going to see a deviation.

10                  CHAIRMAN GRIFFON:   Yes, yes, okay.

11                  DR. MAKHIJANI:     But these are  
12     actual sample values.

13                  DR. TAULBEE:     Yes, but they're  
14     ordered to emphasize this, which is fine.  
15     It's just --

16                  DR. LIPSZTEIN:    And they are not  
17     the same every day and every hour. So even if  
18     you take the time, they are not always the  
19     same. So how do you say that it was always  
20     the same operation with thorium and the air  
21     samples are not the same all the time. So why

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1 do you think that if you do a similar  
2 operation with uranium, we would get the same  
3 mass concentration for thorium if the thorium  
4 is not -- even for thorium -

5 DR. NETON: But let's think about  
6 -- let's think about one thing here, too,  
7 though, the values that we're looking at here  
8 are pretty low. They're not massive amounts  
9 of air concentrations. I'm looking at a 50th  
10 percentile of what -- a couple of micrograms  
11 of material per cubic meter. So, you know,  
12 you've got to look at -- this is a low, a low  
13 air concentration-generating operation to  
14 begin with.

15 I mean it doesn't make it right  
16 that we're underestimating. But I think you  
17 can bound this operation given -- knowing that  
18 it is, you know, it's a low operation. You've  
19 got air sampling data that demonstrates it is  
20 low. You've got urine concentration data that  
21 demonstrates it is low.

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1 DR. MAKHIJANI: We've got 30  
2 samples taken on 15 or 17 days for 13 years.

3 DR. LIPSZTEIN: Yes.

4 CHAIRMAN GRIFFON: Urine samples  
5 you're saying?

6 DR. MAKHIJANI: No, no, air  
7 samples. The number of air sampling days --

8 CHAIRMAN GRIFFON: Right.

9 DR. MAKHIJANI: I mean it was  
10 spread over a period of a few months -- some  
11 months. But the number of days -- a lot of  
12 these samples were taken on the same day. We  
13 don't know why they were taken on those days  
14 and why they were not taken on other days.

15 The total number of days on which  
16 samples were taken were 15 or 17 or something  
17 dotted here.

18 DR. NETON: If I remember it  
19 correctly now --

20 DR. LIPSZTEIN: Yes, the thorium  
21 samples were taken only in 19 days and 16 days

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1 were between June and August `54.

2 DR. NETON: That's when the  
3 campaign happened.

4 DR. LIPSZTEIN: There were two  
5 sampling days in `55. The uranium samples  
6 were taken 13 days in `54 and two days in `55.

7 And you are extrapolating this conclusion  
8 through the whole period until `65. It's --

9 DR. NETON: I guess you wouldn't  
10 even agree then that all these air samples  
11 indicate there is a low air concentration  
12 operation.

13 DR. MAKHIJANI: You've got 30  
14 samples on a few days of --

15 DR. NETON: Of the same type --

16 DR. MAKHIJANI: Well, you know,  
17 when you can prove two different null  
18 hypotheses with the same set of samples,  
19 that's not enough, you know, in my view. So  
20 review your definition of what's not enough  
21 and what's here is not enough.

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1                   And we've taken something that's  
2 not enough in the period for which it is not  
3 enough. And you had campaigns in other times.

4                   And I'll tell you something that  
5 is not in here that came to my mind listening  
6 to Jim as to what is the possible basis for  
7 not using uranium and thorium. They're  
8 different metals.

9                   DR. NETON:     I understand that,  
10 yes.

11                  DR. MAKHIJANI:     They generate  
12 different kinds of dust even in the same  
13 operation. And then later on, we've cited  
14 that in one case you actually had thorium  
15 being inserted into uranium fuel rods --  
16 thorium targets being inserted into enriched  
17 uranium fuel rods. That was happening at  
18 Savannah River Site. It's totally not  
19 covered.

20                  So the number of different kinds  
21 of things that were going on here, the

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1 characteristics of the metals, the generation  
2 of air concentration, as well as the air  
3 concentration data, none of it really provides  
4 -- I presume this has to be robust because  
5 we're after a bounding dose.

6 And what we're saying is this is  
7 not robust. It is far from it.

8 DR. NETON: Well, I think we could  
9 sit here and talk all day about it. I think  
10 we could go back and do some things. I still  
11 am having trouble envisioning why you can't  
12 bound up.

13 Let's just concentrate on this  
14 canning operation. I mean Tim has already  
15 agreed that we're going to go back and take an  
16 action item and take a look at these other  
17 activities. But on the sheer canning  
18 operation where they were just closing these  
19 out, I'm not sensing at all that you guys are  
20 A, willing to admit this is a low dose -- a  
21 low air concentration-potential operation

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1 based on the available data and also based on  
2 the urinalysis data we have for uranium.

3 I don't know what else we can do.

4 But we'll go back and look at the air  
5 concentration data a little closer although  
6 I'm hearing that even if we could prove that  
7 it was a factor of ten lower, there's not  
8 enough air data is basically what you just  
9 said. Too few air samples.

10 So even analyzing those samples  
11 and demonstrating a much more robust  
12 statistical comparison would not really do it  
13 for you because there's not enough air sample  
14 data is what I heard.

15 DR. MAKHIJANI: You've got  
16 sampling -- you've got 33 sample points on 19  
17 days in a very limited period.

18 DR. NETON: And how many days did  
19 this operation run?

20 DR. MAKHIJANI: It ran off and on  
21 for 13 years, right?

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1 DR. TAULBEE: There were campaigns  
2 specifically --

3 DR. MAKHIJANI: Yes, right. Off  
4 and on.

5 DR. TAULBEE: One percent of the  
6 operations in this time period were thorium.

7 DR. MAKHIJANI: I understand that.

8 DR. NETON: So how many thorium  
9 days of operations were there?

10 DR. TAULBEE: Hundreds of thorium  
11 samples when they weren't working with  
12 thorium.

13 DR. MAKHIJANI: You've got the  
14 dates so I don't think that's controversial,  
15 Jim.

16 DR. NETON: I know. But what is  
17 it? What is it?

18 DR. MAKHIJANI: Well, you know --

19 DR. NETON: Out of how many days  
20 of operation?

21 DR. MAKHIJANI: Well, they are all

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1 concentrated in the early period, at one end.

2 They're not spread through -- you had -- what  
3 I'm saying is you had campaigns from 1953 or  
4 '54, whenever, up to 1965 -- the end of your  
5 period when metal -- thorium metal operations  
6 stopped and in '64, the thorium operations  
7 were started. So we're covering the period of  
8 thorium metal operations.

9 And we've got air concentration  
10 data even if you accept that the number of  
11 days was sufficient, you've got thorium  
12 concentration -- the air concentration data  
13 that are at one end.

14 Then we still haven't addressed  
15 Joyce's point that they were different air  
16 samplers. And this is kind of -- I don't know  
17 how that effects it. I actually have not gone  
18 into the air sampler issue with reviewing  
19 Joyce's documents.

20 DR. TAULBEE: Considering that we  
21 have literally thousands of uranium air

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1 samples, we can go through and match from that  
2 standpoint. It's very time consuming. It  
3 will take us a while to do it. But that's  
4 something that can be done.

5 It's not -- the limiting part here  
6 is the thorium air sample data that we have.  
7 And the reason is because of the campaign.

8 There wasn't continuous thorium operations  
9 going on. But we have continuous uranium  
10 operations going on.

11 When we selected the paired  
12 uranium samples, we were purposely trying to  
13 get in the same general time period so that we  
14 weren't trying to compare 1955 samples to 1965  
15 samples.

16 DR. MAKHIJANI: Yes, so how does  
17 that help you to compile -- so what we're  
18 saying is you can have all the uranium data  
19 that you want. How does that help you  
20 establish anything about thorium when you've  
21 got thorium samples from only 19 days in '54

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1 and '55? It won't.

2 If you compile all of the uranium  
3 data, you'll still have the same problem of  
4 only 33 thorium samples.

5 DR. NETON: Yes, I need to go back  
6 and look at what levels we're talking about  
7 here. But I keep looking at micrograms per  
8 cubic meter. I don't know. That converts  
9 into very small air concentrations -- very  
10 small air concentrations.

11 And it's quite possible and likely  
12 in the early days they did some fairly good  
13 air sampling to demonstrate to themselves that  
14 this is not a very high airborne operation.

15 CHAIRMAN GRIFFON: I think that's  
16 exactly what they did probably.

17 DR. NETON: And under the  
18 regulations at the time, they said okay, we  
19 not generating hardly anything to worry about  
20 here. So why would we both to expend  
21 resources to continue to take a lot of air

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1 samples if the process doesn't change.

2 CHAIRMAN GRIFFON: Or you can look  
3 at it the other way and say that they were  
4 doing this to justify just doing uranium,  
5 which is often the case at a lot of these  
6 sites. So they did it in a very controlled  
7 fashion the first process through. And then  
8 there's no audit points -- there's no check  
9 points later

10 (Simultaneous speaking.)

11 DR. NETON: We have classic health  
12 physics -- you know, you evaluate the process  
13 and the activities to determine if there is a  
14 real hazard or not. And you're not going to  
15 continue to throw resources at a problem that  
16 doesn't really exist. So there is a very --

17 DR. LIPSZTEIN: But you were  
18 talking about what they did in the earlier  
19 times and our problem now is that we have to  
20 calculate the dose now for something they  
21 didn't take --

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1 DR. NETON: I said they didn't  
2 take because they had established already that  
3 the air concentrations were low. And we're  
4 using that to say that if nothing in it  
5 changed in the process over that time period,  
6 and we have uranium bioassay data that can  
7 help bound that low activity process -- I  
8 don't understand.

9 DR. LIPSZTEIN: If you look at the  
10 uranium air sample results, they vary a lot.  
11 If you look at the time calculations, they  
12 vary a lot, even on those short periods.

13 DR. NETON: Over time?

14 DR. LIPSZTEIN: Yes, over time in  
15 the short period. So why do you say that  
16 uranium and thorium would have the same air  
17 concentrations? If even these same uranium  
18 concentrations vary --

19 DR. NETON: I'm not --

20 CHAIRMAN GRIFFON: Yes, I'm not  
21 sure I quite follow what --

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1 DR. LIPSZTEIN: I'm saying that  
2 you have said that you justifying using the  
3 uranium bioassay results because it was the  
4 same process although it was different  
5 methods. And that it would generate the same  
6 mass air concentrations.

7 But the mass concentration of  
8 uranium varies a lot, if you look at your own  
9 results. It varies a lot even in the short  
10 period.

11 So why wouldn't the thorium vary  
12 in the same way? I mean it's not a practice  
13 that would generate the same air concentration  
14 every time -

15 DR. NETON: Well, exactly. That's  
16 why -- but if you pick the bioassay, they are  
17 integrators of exposure.

18 DR. LIPSZTEIN: Yes, but --

19 DR. NETON: And they did hundreds  
20 of times more uranium material processing to  
21 generate air concentrations for an intake than

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1 they would for thorium.

2 DR. LIPSZTEIN: Did the bioassay  
3 results all gauge the same results? The same  
4 intake?

5 DR. NETON: We don't have thorium  
6 bioassay --

7 DR. LIPSZTEIN: No, no, I mean the  
8 uranium.

9 DR. TAULBEE: No, there is a  
10 distribution. They vary as well.

11 DR. LIPSZTEIN: So because every  
12 work and every worker have a different --

13 DR. NETON: Right.

14 DR. LIPSZTEIN: So you can't  
15 compare, you know, just because it is a  
16 similar process done on different days by  
17 different workers. You cannot -- you know you  
18 cannot extrapolate from one operation to the  
19 other. You wouldn't extrapolate from one  
20 operation in '53 to one in '65 even if it was  
21 the same metal. Imagine with different

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1 metals.

2 DR. NETON: Let me see if I  
3 understand what we did though. We took --  
4 assumed that the air concentration generally -  
5 - predicted by the bioassay occurred over time  
6 -- it was a chronic exposure, right, over  
7 time?

8 DR. TAULBEE: Yes.

9 DR. NETON: And they did literally  
10 hundreds of times, I think, more uranium  
11 processing than thorium processing.

12 DR. TAULBEE: Yes.

13 DR. NETON: And we assumed that  
14 the thorium workers would have breathed the  
15 same amount of activity over that entire time  
16 period.

17 DR. TAULBEE: Yes.

18 DR. NETON: I mean that's a fairly  
19 claimant-favorable approach.

20 DR. LIPSZTEIN: I think it is a  
21 very uncertain -- uncertain --

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1 DR. NETON: Well, it's uncertain  
2 but it's favorable. I mean -

3 DR. LIPSZTEIN: I don't know.

4 DR. NETON: You've accommodated  
5 for the uncertainty.

6 DR. LIPSZTEIN: I don't know. I  
7 don't know. There is nothing to prove that  
8 this is correct. And second, it is very  
9 uncertain to build the methods goes one way or  
10 the other. It's very, very uncertain.

11 DR. TAULBEE: One thing that you  
12 mentioned, Mark, was about the air sampling,  
13 as we only have in the 1950s. We do have the  
14 uranium going out to the 1965 time period.

15 CHAIRMAN GRIFFON: Right.

16 DR. TAULBEE: We could plot air  
17 concentration data in these buildings all the  
18 way out there, all the way out to 1965 if you  
19 wanted to see whether it increased or  
20 decreased. I happen to have the same opinion  
21 as Jim does from the standpoint of I think

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1 they sampled this initial one to see if the  
2 air concentrations were similar. And when  
3 there wasn't any major problems, they didn't  
4 sample any more.

5 But like I said, we can plot the  
6 uranium air concentrations until 1965.  
7 There's thousands of results. We can even  
8 match them during the thorium campaigns. They  
9 didn't call them thorium air samples because  
10 they were mostly monitoring the normal  
11 operations in the area.

12 So there is air sample data out  
13 there. Again, this would take a tremendous  
14 amount of work but if you feel this is a  
15 critical issue, then we can certainly go and  
16 do it.

17 DR. MAKHIJANI: Let me ask a sort  
18 of clarifying question. We understand what  
19 they did at the time, as Joyce said, doing an  
20 industrial hygiene controlling dust. So they  
21 were satisfied thorium was, you know, under

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1 control and they didn't sample it again. Now  
2 we're going back and try to do a bounding dose  
3 -- a bounding dose calculation using their  
4 idea that thorium was under control.

5 Jim also said that, you know,  
6 these air concentrations are low so we're  
7 talking about low doses. It is my  
8 understanding that SEC doesn't depend on  
9 whether there are low or high doses.

10 DR. NETON: If they're health  
11 endangerment.

12 DR. MAKHIJANI: Yes. There is a -  
13 - you know, you calculate one millirem. Yes.  
14 There's a health endangerment in SECs that  
15 always extend 250 days. And if you were there  
16 for 250 days, it actually doesn't matter what  
17 doses you got.

18 And so I'm just asking for  
19 guidance here. It is my understanding that  
20 you have to be able to establish a bounding  
21 dose or something more accurate than a

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1 bounding dose. We're not talking about  
2 whether it's 50 rem or five rem or one rem.  
3 There may be a lower limit. I don't know what  
4 it is. And maybe it should be specified for  
5 our guidance.

6 But I'm hearing an argument  
7 because generally the thorium doses might have  
8 been low that, you know -- in my  
9 understanding, the bounding dose argument,  
10 that you still have to establish what the  
11 bounding dose was. If you do not have --

12 DR. NETON: Let me correct you  
13 Arjun -

14 CHAIRMAN GRIFFON: With sufficient  
15 accuracy.

16 DR. MAKHIJANI: Otherwise I don't  
17 think we would -- if we used the source term  
18 argument, which was that at Y12 also, we would  
19 have no thorium-related SECs because the  
20 thorium amounts that were processed were  
21 always much less than the uranium amounts that

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1 were processed.

2 And we've argued before that the  
3 source term approach is not satisfactory for  
4 individual workers because we don't know that  
5 individual workers didn't spend a lot of time  
6 working on thorium and that their intakes were  
7 not dominated by that. And certainly that  
8 their doses were not dominated by that when  
9 you are comparing thorium and uranium.

10 DR. NETON: I just want to correct  
11 the record. I was not suggesting that this  
12 should not be an SEC because the doses were  
13 low.

14 DR. MAKHIJANI: Okay.

15 DR. NETON: I was saying that we  
16 have evidence that the doses were very low.

17 DR. MAKHIJANI: Okay.

18 DR. NETON: They stopped  
19 monitoring probably because the doses were  
20 very low. And that's why there is a  
21 discrepancy. That also lends credence to the

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1 argument that there was probably no  
2 differences in the processes as time went on.

3 DR. MAKHIJANI: Okay.

4 DR. NETON: I do have a problem,  
5 though, you know, when you get down to this  
6 one millirem -- several millirem doses and  
7 we're going to argue it is not sufficiently  
8 accurate and, therefore, it becomes an SEC. I  
9 have some fundamental problems with that.

10 DR. MAKHIJANI: I'm not arguing.  
11 I was just asking for guidance as to whether  
12 we are aiming for a bounding dose or not. And  
13 I don't think we're talking about millirem  
14 doses.

15 DR. NETON: But they're micrograms  
16 per cubic meter, which is pretty low in my  
17 opinion. I mean if you're down -- well, I can  
18 do the calculations -- 667 dpm per milligram.

19 So that's like six-tenths of a dpm -- in that  
20 range -- one, to two, to three dpm per cubic  
21 meter of uranium is my rough -- don't hold me

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1 on this -- but it's small.

2 It's like 1/70th of the  
3 recommended maximum concentration, somewhere  
4 in that vicinity.

5 DR. TAULBEE: Uranium maximum MAC  
6 was 50 micrograms. The corresponding thorium,  
7 if -- yes.

8 DR. NETON: If it's what -- if it  
9 goes to five? So it's a pretty small --

10 DR. TAULBEE: But one statement  
11 here, Arjun, that I was -- that I have some  
12 concern with is when you talked about, you  
13 know, that you can't apply this because one  
14 particular individual might have, you know,  
15 basically only worked with thorium. And I  
16 don't see who that's plausible in this  
17 scenario because of the limited campaigns.

18 DR. MAKHIJANI: I didn't say only  
19 worked with thorium. I said that one  
20 individual could have gotten most of their  
21 doses from thorium work. And given the

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1 difference between thorium and uranium and  
2 given the fact that some worker may have  
3 consistently worked with thorium through all  
4 the campaigns, and then you've got a situation  
5 where, for some organs, your uranium bioassay  
6 is really not relevant for that person because  
7 their doses are dominated by their thorium  
8 work experience.

9 It's just -- you know, if you had  
10 two radionuclides that were very comparable in  
11 terms of their dose effects per unit mass  
12 intake, it's a different situation.

13 DR. LIPSZTEIN: Because we are  
14 doing a coworker data for you and  
15 extrapolating it two times. And when you do  
16 the coworker, it already has a lot of  
17 uncertainties because people wouldn't do the  
18 same job. But you are doing not only the  
19 uncertainty -- extrapolating the uncertainty  
20 from the coworker study for uranium to a  
21 coworker for thorium, so that's -- even --

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1 DR. TAULBEE: I think it is  
2 uncertainly high, very high.

3 DR. LIPSZTEIN: Yes. Very high,  
4 yes.

5 DR. NETON: Well, especially if we  
6 assume -- did we assume a fraction -

7 DR. TAULBEE: No.

8 DR. NETON: See we assume that  
9 there was a person who was there the entire  
10 time breathing the thorium air concentration  
11 for the entire campaign.

12 DR. NETON: But only one percent  
13 of the -

14 (Simultaneous speaking.)

15 CHAIRMAN GRIFFON: You're assuming  
16 the whole year was thorium production  
17 basically.

18 DR. NETON: The workers sat there  
19 are producing thorium slugs the entire year at  
20 the air concentration equal to whatever the  
21 bioassay projected for uranium.

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1 DR. LIPSZTEIN: I don't know. But  
2 it is a lot of uncertainty anyway.

3 DR. NETON: But I think we bound  
4 it.

5 DR. LIPSZTEIN: If you're  
6 extrapolating it --

7 DR. NETON: Well, that's why we  
8 use bounding calculations.

9 DR. LIPSZTEIN: Yes, but I don't  
10 know because we don't even know if this person  
11 would work with --

12 DR. NETON: That's why we do a  
13 bounding calculation.

14 DR. LIPSZTEIN: Yes, but --

15 DR. NETON: I mean I guess I don't  
16 understand why it is not a bounding approach.

17 DR. LIPSZTEIN: It's not -- it's  
18 like if you put -- it's the same thing if you  
19 put the bounding with an unbelievable dose and  
20 say that's very high --

21 DR. NETON: Well, no, I think

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1 that's not fair. That's not even close to  
2 what we do.

3 DR. LIPSZTEIN: Well, it's  
4 uncertainty over uncertainty.

5 DR. NETON: No, it's not. It's  
6 not, that's silly. It's taking actual  
7 measured air concentration data of dust --  
8 dust loading in the plant -- estimated dust  
9 loading and saying that the person breathed  
10 that level of dust loading based on actual  
11 measurements of workers in that same exact  
12 environment in that same exact time period.  
13 That's not that unbelievable.

14 DR. LIPSZTEIN: Yes, doing a  
15 different operation and the coworker model,  
16 for me to work, is the person that does the  
17 same --

18 CHAIRMAN GRIFFON: It's a small --  
19 you can define a little differently for rem.

20 DR. NETON: But anyway --

21 CHAIRMAN GRIFFON: Yes.

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1 DR. NETON: I don't know. I don't  
2 whether we're going to get anywhere.

3 CHAIRMAN GRIFFON: Well, yes,  
4 let's leave that one for now. I mean let's  
5 get through the last -- are there more  
6 findings in this? And then we can break and  
7 look at that data in a few minutes. Maybe  
8 we'll close something out with that.

9 (Laughter.)

10 DR. NETON: Well, to be fair, we  
11 received this report and we need a form a  
12 response.

13 CHAIRMAN GRIFFON: No, I know.

14 DR. NETON: Discussions are  
15 helpful.

16 CHAIRMAN GRIFFON: Yes. I assumed  
17 that more than you were working on this. At  
18 any rate, Joyce, I think you did Finding 5  
19 already, right?

20 DR. LIPSZTEIN: Yes. We did that.

21 CHAIRMAN GRIFFON: We covered it,

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1 yes. So I don't think we need to go over that  
2 any more.

3 DR. TAULBEE: Just one comment on  
4 the Finding 5 there, U-233, in this --  
5 especially in these earlier time periods, U-  
6 233 was not a concern contaminant at all in  
7 these particular thorium rods that were coming  
8 in. These were natural thorium coming from  
9 Ames to -- going to Sylvania being rolled and  
10 then directly to Savannah River.

11 So there really isn't an issue  
12 with U-233 there. Now there could be when we  
13 get into the thorium oxide time period in the  
14 1960s, after they --

15 CHAIRMAN GRIFFON: So before it  
16 was not an issue?

17 DR. TAULBEE: I wouldn't think  
18 there was from uranium metal standpoint.

19 CHAIRMAN GRIFFON: Right.

20 DR. TAULBEE: That was the whole  
21 goal was to make this for the AEC.

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1 CHAIRMAN GRIFFON: Right, right.

2 DR. TAULBEE: So it wasn't present  
3 initially.

4 CHAIRMAN GRIFFON: No, I was more  
5 asking when the cutoff was.

6 DR. LIPSZTEIN: Let me just find  
7 something. As I took that because there was -  
8 - I found some documents about the U-233 in  
9 that time period. I don't know if it's

10 CHAIRMAN GRIFFON: That's the  
11 progress report in 1961 that you're  
12 referencing in your second paragraph. Isn't  
13 that what you're looking at? It says in the  
14 diagram the combined risk uranium/thorium  
15 target slug --

16 DR. TAULBEE: Enriched uranium  
17 would have been U-235.

18 CHAIRMAN GRIFFON: Yes, enriched,  
19 I know.

20 DR. LIPSZTEIN: I found.

21 DR. TAULBEE: You were raising

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1 that enriched U-233, right?

2 DR. LIPSZTEIN: I found -- I don't  
3 know where but I found some documents  
4 referring specifically to this and this time  
5 period, yes.

6 CHAIRMAN GRIFFON: Okay.

7 DR. LIPSZTEIN: Can I --

8 CHAIRMAN GRIFFON: So there  
9 probably is a cutoff time period though. That  
10 makes sense, yes.

11 DR. LIPSZTEIN: Since you are  
12 going to respond to this document aren't you?

13 DR. NETON: Oh, yes.

14 CHAIRMAN GRIFFON: Well, is there  
15 any more findings on this? Is there --

16 DR. LIPSZTEIN: Yes.

17 DR. MAKHIJANI: I think there were  
18 a couple more findings, right?

19 DR. TAULBEE: Number 6.

20 CHAIRMAN GRIFFON: Oh, it's the  
21 construction worker thing, the last one.

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1 DR. MAKHIJANI: Yes.

2 DR. LIPSZTEIN: Right.

3 DR. MAKHIJANI: Yes, well, you can  
4 introduce this. It's not in the report but  
5 Joyce thought of this after the report. And I  
6 told her that we should just introduce it at  
7 this time.

8 DR. LIPSZTEIN: There are some  
9 calculations for thorium intakes in this  
10 document. And we didn't put this in our  
11 document. But reviewing it, also the results  
12 for thorium was only eight air samples from  
13 '54. And so we don't think it is sufficient  
14 to bound thorium intakes from '53 to '65. I  
15 didn't put this in the report.

16 So that's something else. And the  
17 definition of thorium intakes is not trivial.

18 As you know, a difficult problem with the  
19 methodologies we have today.

20 DR. TAULBEE: Okay. You're  
21 talking about the thoron. The thoron, yes.

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1 DR. LIPSZTEIN: The thoron.

2 DR. TAULBEE: Okay, that's what I  
3 was --

4 CHAIRMAN GRIFFON: Oh, okay.

5 DR. LIPSZTEIN: Thoron, yes.

6 DR. TAULBEE: It's basically in  
7 the data, yes.

8 DR. LIPSZTEIN: So, in Table 7-5,  
9 yes, 7-5, you have two samples from July 1954  
10 -- from July 1954. And they refer to the  
11 same sample if you go back to the data from  
12 where it was extracted, and one result was  
13 obtained using beta-gamma measurements and the  
14 other was obtained using alpha counting.

15 So also the thorium results, they  
16 were different depending on the counting  
17 system. So one result is 16.8 picocuries per  
18 cubic meter was obtained using alpha counting.

19 And the 8.06 picocuries per cubic meter was  
20 using beta-gamma. So I don't think those  
21 results can be used to extrapolate anything

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1 about radon-220.

2 So I think this has to be reviewed  
3 also.

4 DR. NETON: Well, I think we'd  
5 like to get something in writing rather than  
6 just verbal.

7 DR. MAKHIJANI: Yes, we can send  
8 that.

9 DR. NETON: Yes, I would send an  
10 update.

11 DR. LIPSZTEIN: But just to say  
12 you have to go back to the air sample results  
13 and you see that they were not always -- they  
14 are very limited data and some of the results  
15 doesn't come from alpha counting. It comes  
16 from beta counting.

17 DR. NETON: We'd have to look at  
18 that.

19 DR. MAKHIJANI: We'll send you --  
20 what we will do is kind of maybe do a Rev. 1.  
21 I didn't want to -- they send it to me just a

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1 few days ago. And I thought it could be Rev.

2 1.

3 DR. NETON: It would be good to  
4 have it in writing so that we can respond to  
5 it.

6 DR. LIPSZTEIN: Okay.

7 DR. NETON: I'd have to look at  
8 it. I'm not following exactly what you are  
9 saying. But I do remember the analysis that  
10 we did.

11 CHAIRMAN GRIFFON: Okay. Why  
12 don't we take a 15 minute break now. I say 15  
13 because I want to give us time to look at this  
14 -- to do a sidebar and look at this data, yes.

15 So on the phone, we're going to take a 15  
16 minute break. We'll start back at 10:45 or  
17 so.

18 (Whereupon, the above-entitled matter went off  
19 the record at 10:32 a.m. and  
20 resumed at 10:48 a.m.)

21 MR. KATZ: Let me just check

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1 before we get started that I have my Board  
2 Members on the line?

3 That would be Brad and Phil?

4 CHAIRMAN GRIFFON: It might not be  
5 10:45 yet.

6 MR. KATZ: Do we have anyone on  
7 the line yet?

8 MS. LIN: Yes, this is Jenny.

9 MR. KATZ: Oh, hi, Jenny. Good.  
10 Thank you for confirming that we're hooked up  
11 still.

12 CHAIRMAN GRIFFON: Brad took me  
13 literally. He's going to be back at 10:45 his  
14 time.

15 (Laughter.)

16 MR. KATZ: Phil or Brad?

17 CHAIRMAN GRIFFON: And Phil.

18 MEMBER SCHOFIELD: Yes, I'm on the  
19 line.

20 MR. KATZ: Okay, thanks, Phil, for  
21 checking in.

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1                   Okay, well anyway, carry on.

2                   MR. MORRIS: Dr. Katz?

3                   MR. KATZ: Yes.

4                   MR. MORRIS: Robert Morris. I've  
5 joined.

6                   MR. KATZ: Oh.

7                   MR. MORRIS: I have no conflict.  
8 I'm with the ORAU Team.

9                   MR. KATZ: Okay. Thank you, Bob.  
10 Welcome. And it's just Ted -- no doctor --  
11 but thanks.

12                  CHAIRMAN GRIFFON: Okay. We're  
13 still on Matrix Item 1. And I guess we can  
14 just report back from what we looked at the  
15 break just for those on the phone. Maybe Tim  
16 can summarize what you all looked at and what  
17 you found.

18                  DR. TAULBEE: Yes, from what I was  
19 able to see, the spreadsheet that Joyce has  
20 developed is a combination of the thorium  
21 logbook, which is all that we had looked at,

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1 and the thorium bioassay cards. And so Joyce  
2 combined them both together. And that's a  
3 discrepancy that we did not do. And so we do  
4 need to go back and look at those for the 773  
5 because there certainly appears to be some  
6 positive technical thorium results that we  
7 missed because we did not look at those  
8 bioassay cards.

9 CHAIRMAN GRIFFON: Okay. And like  
10 we were saying at the break, it may not have  
11 so much bearing on the other discussions we're  
12 having but it may point out that there was  
13 something else going on that resulted in these  
14 higher values, right?

15 DR. TAULBEE: This could have a  
16 bearing on the 773 at Finding 3 that I think  
17 we need to go back and look at the extent of  
18 those operations that we initially thought  
19 were very small.

20 And they might have been larger,  
21 possibly resulting in this bioassay and some

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1 of the positive results that we see here. So  
2 we'd like to go back and look at that.

3 DR. MAKHIJANI: Yes, I have a  
4 question about that --

5 DR. TAULBEE: Yes?

6 DR. MAKHIJANI: Because at the  
7 start of our discussion, Tim was saying that,  
8 you know, the personnel were going back and  
9 forth. And so I think we have the names of  
10 the people and we have their bioassay records.

11 So if some of these people were  
12 actually going back and forth, as might be  
13 indicated, then it would raise a question as  
14 to whether some of this -- it would be very  
15 difficult actually to disentangle and  
16 interpret this bioassay as purely being either  
17 one area or the other unless, you know, there  
18 were 773 operations in the high level caves on  
19 those days and we can locate these workers.

20 So if there were some 773 workers  
21 in the 300-M area at those times, then I think

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1 it would throw some very big questions into  
2 the method that NIOSH is proposing because  
3 there are --

4 CHAIRMAN GRIFFON: Yes, because  
5 your current model would not result in those  
6 higher

7 DR. MAKHIJANI: No, no, that's  
8 right. Not at all.

9 CHAIRMAN GRIFFON: So a good  
10 point. Okay. Action items, let me just try  
11 to summarize because I like to do these notes  
12 live so I don't --

13 DR. MAKHIJANI: Okay.

14 CHAIRMAN GRIFFON: I'll never  
15 follow up on these when I get back to  
16 Deepwater tomorrow. So the action -- I mean  
17 so that is an action item for number two  
18 really, right? For Finding No. 2, that you'll  
19 go back to that data -- NIOSH will go back to  
20 that?

21 DR. TAULBEE: Yes, Finding 2 and

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1 3.

2 CHAIRMAN GRIFFON: Two and three,  
3 yes. Were there any other action items  
4 related to this matrix item?

5 DR. TAULBEE: My question for you  
6 is in an extensive discussion about the  
7 thorium air sample and uranium air sample  
8 results in the 300 area that we had mentioned  
9 was for confirmation type of purposes, is  
10 there a need for us to go back and look at all  
11 of the uranium data over that 13 years? Or  
12 can we leave that alone for now and just work  
13 on the 773 -- or the Items 2 and 3?

14 CHAIRMAN GRIFFON: I'm not sure  
15 that that later uranium data is going to help  
16 us much. I mean to weigh in -- I don't --  
17 unless SC&A thinks it would be useful.

18 DR. MAKHIJANI: I wouldn't see  
19 going through all the trouble that Tim has  
20 indicated it would take to compile all that  
21 uranium data. I mean if you want to compile

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1 some of the -- you know, high dust-generating  
2 data for uranium and see, you know, in the  
3 same period, to see if there were any that  
4 were higher than the high thorium data, that  
5 might be useful.

6 CHAIRMAN GRIFFON: Yes, I still  
7 don't see --

8 DR. MAKHIJANI: But I don't --

9 CHAIRMAN GRIFFON: I know you're  
10 saying it was ordered but I still don't see if  
11 you look at the top end thorium data, I'm  
12 assuming, you know, based on the operational  
13 side of it, I'm going to maybe assume that  
14 those are related to those sort of top end  
15 operations, you know, the grinding or cutting  
16 or whatever.

17 And when you compare the thorium  
18 values to the uranium values, the highest  
19 uranium values are nowhere near the highest  
20 thorium values.

21 DR. TAULBEE: But this is because

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1 they were more the normal operations more from  
2 not --

3 CHAIRMAN GRIFFON: Yes, but there  
4 is none -- there's none.

5 DR. TAULBEE: There's some.

6 DR. MAKHIJANI: There aren't any.

7 That's what I'm saying. If you took the  
8 comparable uranium operations and took the  
9 comparable thorium operations just for that  
10 limited period, even if they are only eight  
11 data points --

12 CHAIRMAN GRIFFON: Yes.

13 DR. MAKHIJANI: At least we can  
14 settle this question --

15 CHAIRMAN GRIFFON: Yes.

16 DR. MAKHIJANI: As to whether  
17 uranium was generating more dust in the dusty  
18 operations than thorium. I think that is  
19 worthwhile settling. I don't think it is  
20 worthwhile doing compiling --

21 CHAIRMAN GRIFFON: Yes, don't do

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1 all the other uranium data. But I think that  
2 would be worthwhile looking at. Where is that  
3 plotted? What graph is it in?

4 DR. MAKHIJANI: It's Figure 3 in  
5 the report.

6 CHAIRMAN GRIFFON: Yes. And  
7 perhaps -- well, anyway, I can't seem to find  
8 it.

9 DR. TAULBEE: Okay, we'll take  
10 that action item to try and pair some results  
11 based upon operation and location.

12 CHAIRMAN GRIFFON: Yes.

13 DR. MAKHIJANI: For that time  
14 period.

15 DR. TAULBEE: In this time period,  
16 yes.

17 CHAIRMAN GRIFFON: Yes.

18 DR. TAULBEE: Okay.

19 CHAIRMAN GRIFFON: Okay.

20 DR. TAULBEE: That's what we will  
21 try and do but we won't go to an extensive

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1 length to try and expand it out 13 years.

2 We're in agreement on that?

3 DR. MAKHIJANI: Yes.

4 CHAIRMAN GRIFFON: Yes. Just  
5 during that time period.

6 DR. MAKHIJANI: That's my opinion.

7 DR. TAULBEE: Okay.

8 CHAIRMAN GRIFFON: In Figure 3 in  
9 the SC&A report, that's standard data. So  
10 those two actions I think are -- and I think  
11 I'm going to edit the actions live but I had a  
12 PDF open so I couldn't edit.

13 MR. KATZ: You have another action  
14 item unless I missed it --

15 CHAIRMAN GRIFFON: Go ahead.

16 MR. KATZ: Which was DCAS was  
17 supposed to examine other non-canning  
18 activities.

19 CHAIRMAN GRIFFON: Oh, yes.  
20 That's Finding 3.

21 MR. KATZ: Okay. So you covered

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1 that, right?

2 DR. TAULBEE: That's Finding No.  
3 3.

4 CHAIRMAN GRIFFON: Three, yes,  
5 which is all those other operations that you  
6 have.

7 DR. MAKHIJANI: So there are three  
8 actions.

9 CHAIRMAN GRIFFON: Yes, three  
10 actions.

11 DR. MAKHIJANI: I counted that  
12 correct.

13 DR. TAULBEE: Correct, that's  
14 right.

15 CHAIRMAN GRIFFON: Okay. All  
16 right. Then why don't we --

17 MR. KATZ: Just, Tim, soon after  
18 this meeting, if you could just put out a list  
19 of the action items by email. Send it to  
20 Arjun. He can confirm that it covers  
21 everything of his, too.

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1                   And that way we'll have an actual  
2 piece of paper that gives us just the action  
3 items.

4                   DR. MAKHIJANI: Oh, and we have an  
5 action item. Sorry. We are going to send you  
6 a Rev. 1 with the thoron included.

7                   CHAIRMAN GRIFFON: Right. Okay.  
8 So there's four actions. You've got that one,  
9 also?

10                  DR. TAULBEE: Mike, you are  
11 recording these?

12                  MR. MAHATHY: I am.

13                  DR. TAULBEE: Thank you.

14                  CHAIRMAN GRIFFON: Okay. That's a  
15 good idea, Ted. Thank you. So Tim will --  
16 usually I've kept the action list in my Work  
17 Group. But I would appreciate to have you do  
18 it, especially since I was trying to edit a  
19 PDF document and it wasn't working.

20                  DR. MAKHIJANI: I'll care of it.

21                  CHAIRMAN GRIFFON: Okay. Why

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1 don't we move on to -- as we -- if it's okay -  
2 - okay -- I think we -- for sake of schedule,  
3 we were going to move to Item 9 now.

4 DR. MAKHIJANI: Okay.

5 CHAIRMAN GRIFFON: The tritium  
6 matrix item.

7 DR. MAKHIJANI: Could I check  
8 whether Harry is on the line?

9 Harry, are you still on the line?

10 DR. CHMELYNSKI: Yes, I'm here,  
11 Arjun.

12 DR. MAKHIJANI: Thank you, Harry.

13 CHAIRMAN GRIFFON: So let's just  
14 move to -- we completed Matrix Item 1. But  
15 for the sake of some folks' schedules, we're  
16 going to do Matrix Item 9 now, which is the  
17 tritium coworker model. And I believe NIOSH  
18 had the action. And they're going to take the  
19 lead presenting what they worked on to start  
20 us off.

21 DR. TAULBEE: Okay. Thanks, Mark.

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1 I wanted to start out the  
2 discussion and what's our goal here with this  
3 analysis was. And the fundamental use of the  
4 coworker model is to estimate dose to  
5 unmonitored workers.

6 So, you know, at Savannah River,  
7 we have a lot of claimants who have some  
8 tritium monitoring data. And so we've taken  
9 their data and, as I mentioned, the goal is to  
10 develop, you know, what is the dose for  
11 somebody who wasn't monitored but possibly  
12 should have been monitored.

13 And so we assume that the  
14 occurrence of unmonitored workers occurred at  
15 random. And this is one of the critical  
16 assumptions that we've done here in our  
17 report. And, by the way, the authors of this  
18 report are Tom LaBone and Daniel Stancescu,  
19 who is sitting here today.

20 And there's really three different  
21 assumptions that could have been made.

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1                   One was that the occurrence of  
2 unmonitored workers occurred completely at  
3 random. Another was that unmonitored workers  
4 had a lower potential for an intake of tritium  
5 than did the monitored workers, which is  
6 consistent with a radiological protection  
7 program, and the third is that the unmonitored  
8 workers, on average, had a higher potential  
9 for tritium exposure than monitored workers,  
10 which is inconsistent with regulations and  
11 monitoring practices all the way back since  
12 the beginning of operations.

13                   We went with Assumption No. 1.  
14 That the unmonitoring occurred at random. So  
15 effectively we're not taking credit, if you  
16 will, for the application of a radiation  
17 protection program there at the site. So  
18 that's our first part that I wanted to  
19 emphasize with what we are going for.

20                   So within this Work Group, we were  
21 tasked with -- well, construction trades work

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1 is different than most monitoring operations.

2 And so construction trades workers were more  
3 heavily exposed. That is what the initial  
4 comment was because they had to start looking  
5 at a coworker model.

6 And so this was our starting  
7 point. So we wanted to compare construction  
8 trades workers at strata with a complete  
9 sample of how we develop a typical coworker  
10 model. And in the past, all of our coworker  
11 models take data from everybody that was there  
12 on site. We don't stratify. At least we  
13 generally have not done this.

14 And so this is kind of the first  
15 time that we started looking at how do we  
16 compare a strata versus the complete sample.  
17 And as I mentioned, this worker raised that  
18 particular issue of construction trades  
19 workers. So what Tom and Daniel did was  
20 develop a test on how we could compare these  
21 two different strata, construction trades

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1 workers, a model on construction trades  
2 workers, and a model of all workers.

3 And so the basic null hypothesis  
4 was that the coworker model derived from  
5 construction trades workers strata is a simple  
6 random sample from all coworker models having  
7 the same size as the construction trades  
8 workers. Typically construction trades  
9 workers we have less -- we have a smaller  
10 number and then we have a large compared to  
11 all workers. That can be derived from the  
12 population of monitored workers.

13 In other words, the coworker model  
14 derived from the construction trades workers  
15 stratum would tend not to be significantly  
16 different than the coworker model from a  
17 population of all monitored workers. So  
18 that's the null hypothesis. And the  
19 alternative is the opposite.

20 So the big difference between what  
21 we did and what Harry did -- and this is

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1 something that we probably should have  
2 discussed before Harry did his analysis and we  
3 did ours as well, was that we looked at dose.

4 Because of the biokinetic - tritium  
5 biokinetic models are fairly simple and easy  
6 to use and so forth, we went through and we  
7 combined every individual on an annual basis  
8 to dose -- all the bioassays whereas what  
9 Harry did was he looked at just the bioassay.

10 So really to compare Harry's  
11 report to our report, we're really comparing  
12 apples and oranges because one is just  
13 bioassay data and the other is the whole dose  
14 model. So I wanted to emphasize that  
15 particular point.

16 Now since tritium monitoring has  
17 such a low detection threshold, there's really  
18 no missed dose effectively with this -- no  
19 significant missed dose compared to what you  
20 get, especially with plutonium and uranium, et  
21 cetera. So this was another consideration

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1 that we did in developing how we were going to  
2 do this analysis.

3 DR. MAKHIJANI: What was that? It  
4 was a different threshold at different times,  
5 right? I mean detection limits?

6 DR. TAULBEE: It was but it kept  
7 getting lower.

8 DR. MAKHIJANI: Yes, that's what I  
9 mean.

10 DR. TAULBEE: The initial one was  
11 one microcurie and they kept that one for a  
12 long period of time. And then it dropped to  
13 .5 and then down to .1. But it --

14 DR. MAKHIJANI: That's a fairly  
15 high detection limit, right?

16 DR. TAULBEE: One microcurie?

17 DR. MAKHIJANI: One microcurie per  
18 --

19 DR. TAULBEE: That doesn't result  
20 in much dose.

21 DR. MAKHIJANI: Just raising the

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1 question.

2 DR. TAULBEE: The -- so this was  
3 our major consideration. And our goal here  
4 was for coworkers that we would only have one  
5 data point for that person for that year  
6 whereas if you looked at all of the bioassays,  
7 one person could have 50, one person could  
8 have 80 data points whereas if you combine it  
9 all into dose, then we're looking at a  
10 coworker.

11 You know this is one particular  
12 coworker's dose, another coworker's dose, et  
13 cetera, instead of one coworker dominating the  
14 bioassay dataset effectively. All of this was  
15 rolled into an annual basis.

16 So this was our goal. Is there a  
17 difference between construction trades workers  
18 -- a construction trades worker coworker model  
19 and a coworker model developed from all of the  
20 monitored data that we had?

21 The procedure that Tom and Daniel

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1 developed -- and when I keep mentioning Tom  
2 and Daniel here, Tom did all of this work in  
3 our statistical package and Daniel did this --  
4 repeated it all in SAS. So we've got --  
5 actually this is the dual analysis going on.  
6 And they compared the results and they  
7 matched.

8 So with the -- the method or the  
9 procedure was to take all of the tritium doses  
10 for all monitored workers in a given year and  
11 fit a log-normal distribution to it. And  
12 that's Figure 1 in our report -- in Daniel and  
13 Tom's report. And it's just a simple fit of  
14 the data.

15 In this particular case, there is  
16 122 individuals. Now keep in mind this  
17 comprises probably a thousand or so data -- or  
18 tritium bioassay results that have been rolled  
19 up individually into a single dose. And then  
20 the next step was to take the tritium dose  
21 from just the construction trades workers and

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1 fit a log-normal distribution. And that's  
2 Figure 2.

3 And in this case, for 1954, we had  
4 122 workers total, 33 of which were  
5 construction trades workers. So about 25  
6 percent of the data was construction trades  
7 workers.

8 And then we wanted to compare the  
9 distributions. And this is where it gets into  
10 something that Arjun mentioned earlier of when  
11 you have different -- I can't remember the  
12 words exactly -- if you can come to different  
13 conclusions, depending upon your statistical  
14 test, you've got some problems.

15 And this is a case where if you  
16 just compared the 50th percentiles of the  
17 geometric means, you would find that the  
18 construction trades workers had a lower  
19 geometric mean compared to the complete sample  
20 of -- let's see, it was 6.4 versus -- I'm  
21 sorry, 7.4 versus 7.79.

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1                   However, the geometric standard  
2 deviation was larger. So then if you compared  
3 the 84th percentile with the 95th percentile,  
4 you'd reach a different conclusion depending  
5 on which statistical test you chose.

6                   So in an attempt to avoid this,  
7 what Tom and Daniel did was to actually look  
8 at the parameters that were used in a coworker  
9 model. When we apply these models, we use  
10 geometric means and geometric standard  
11 deviations. That's what we end up plugging  
12 into IMBA in order to calculate the dose.  
13 Well, in this case, it wouldn't be IMBA. It  
14 would just be into IREP directly.

15                   So this was what led to the  
16 development of the Monte Carlo permutation  
17 test. And the idea here is that if you take  
18 the complete sample and you pull out --  
19 there's 33 -- if you randomly pull out 33  
20 samples -- 33 people, and calculate what their  
21 difference -- I'm sorry, pull them out, fit a

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1 log-normal distribution to their data,  
2 calculate the geometric mean and geometric  
3 standard deviation, and then determine the  
4 difference between the geometric mean -- the  
5 original geometric mean -- geometric standard  
6 deviation from this new sample. What is the  
7 variability that you see there?

8 And so this is what we did. And  
9 you end up with the -- and you plot what those  
10 differences are. Well, you repeat this 10,000  
11 times. And this is what results in Figure 3.

12 This is this elliptical plot effectively.  
13 And around that plot, you can draw a 95th  
14 percent confidence interval associated with  
15 that plot.

16 And so for our test, each of these  
17 red dots, by the way, represent an individual  
18 poll of these 33 workers, okay? And what  
19 their geometric mean and geometric standard  
20 deviation would be, depending upon the random  
21 poll.

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1                   Once we did this, we then plotted  
2                   the data, as you see, and then plotted where  
3                   the construction trades worker distribution  
4                   fell.     If it fell within the 95 percent  
5                   confidence interval, we felt there is no  
6                   difference statistically between a coworker  
7                   model developed of all monitored workers  
8                   versus a coworker model of construction trades  
9                   workers.

10                   And so we did this for each year  
11                   from 1954 up through 1990.   And so these were  
12                   our results.   Well, for this first comparison,  
13                   25 of the 37 years we saw no difference, no  
14                   statistical difference between construction  
15                   trades workers and the complete samples.

16                   Now, again, I want to emphasize,  
17                   this is for tritium only.   If we applied this  
18                   to uranium, plutonium, americium, californium,  
19                   curium, I don't know that this would be the  
20                   case.   But for tritium, what we see is that  
21                   there is no statistical difference between

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1 construction trades and from the complete  
2 sample.

3 Now in the years where we did see  
4 a difference, the geometric mean of the  
5 construction trades was lower for all of the  
6 years except for one. So of these 12 years  
7 where we did see a statistical difference, the  
8 geometric mean or the construction trades dot  
9 fell to the left of this elliptical circle,  
10 indicating that their dose was lower than the  
11 all-monitored workers.

12 One year, it was actually on the  
13 right-hand side. And I think that was 1964.  
14 It's there in the report.

15 So that was our first -- that was  
16 our comparison because this is what I think  
17 the fundamental question that the Board posed  
18 to us was is, is there a difference.

19 Now one of the concerns I had with  
20 this test was if there was a real difference,  
21 could we see it?

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1 DR. MAKHIJANI: Could I ask a  
2 question? A clarifying question?

3 DR. TAULBEE: Sure, certainly.

4 DR. MAKHIJANI: Now for these ones  
5 where the geometric mean for the construction  
6 workers was lower in those 11 years --

7 DR. TAULBEE: Yes?

8 DR. MAKHIJANI: Was the GSD also  
9 lower? So are we sort of in the northwest  
10 part of this curve or the southwest part of  
11 this Figure 3?

12 DR. TAULBEE: I would have to go  
13 back and look in each of those. And if you  
14 notice, the report is 300 pages long. So you  
15 have to use plots.

16 DR. MAKHIJANI: Yes, yes. I'm  
17 just talking about Figure 3. So it would make  
18 a difference --

19 DR. TAULBEE: Well, we can go look  
20 right now if you want.

21 DR. MAKHIJANI: Well, no -- well,

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1 I guess we don't know -- I don't know that I  
2 want to detain the -- I just want to know  
3 whether -- because it does make a difference  
4 whether we're talking about the mean or  
5 whether you're talking about, as you said  
6 earlier, 84th percentile. So --

7 DR. TAULBEE: Well, let me --

8 DR. MAKHIJANI: If you have both  
9 the GSD and the geometric mean that are lower,  
10 then you're good. But if they are in  
11 different directions, then there is an open  
12 question.

13 MR. STANDESCU: I actually happen  
14 to have the results here for the construction  
15 workers. So in the years when we observed a  
16 difference, so the construction workers had a  
17 larger median than the median for the all  
18 construction workers. And the GSD, the  
19 difference was like .1 in either direction.  
20 It can be like plus or minus. So it was not  
21 like a definite pattern.

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1 DR. MAKHIJANI: So small.

2 MR. STANDESCU: Very small. It  
3 was like .1, .4, .17, .005, .008. So the  
4 difference in GSD was really small and it was  
5 in both directions.

6 DR. MAKHIJANI: Okay.

7 DR. TAULBEE: Thank you, Daniel.

8 So that was, like I said, the main  
9 comparison that we felt was is there a  
10 difference for tritium between construction  
11 trades and non-construction trades or the  
12 complete sample.

13 We wanted to know is this test  
14 powerful enough to see a real difference that  
15 fundamentally we believed existed? And that  
16 would be a difference between say reactor  
17 workers versus a coworker model developed from  
18 the complete sample.

19 Reactor work was suspected to be  
20 higher because the work is over an open pool  
21 of cooling water there in the disassembly area

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1       whereas in the tritium facilities, you have a  
2       lot of fume hoods and a lot of glove boxes and  
3       a single pass type of fume hoods and glove  
4       boxes.       So the air concentrations are  
5       generally lower than what you would observe  
6       there in the disassembly area.

7                       We went through and did this, the  
8       same exact test. And in this particular case,  
9       we found that yes, there was a significant  
10      difference between reactor workers and the  
11      complete coworker model. And in fact, for 29  
12      of the 37 years we saw a difference where the  
13      reactor workers' data was higher. So this  
14      test is powerful to see these differences.

15                      The difference in the geometric  
16      mean was on the order of -- I think the  
17      maximum was on the order of -- do you have  
18      that number handy there for reactor workers?

19                      MR. STANCESCU:     I think it was  
20      like 26.

21                      DR. TAULBEE:     Twenty-six to say

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1 30, 40 millirem range. So we're looking at a  
2 pretty sensitive test is what I'm trying to  
3 get at for this particular application.

4 MR. STANDESCU: Actually 130.

5 DR. TAULBEE: One-thirty?

6 MR. STANDESCU: Thirty millirems,  
7 the largest difference between the --

8 DR. TAULBEE: That was the  
9 largest, okay. So we're looking at this test  
10 being able to see a difference, you know,  
11 below 30 millirem, between two populations.

12 Now the final test we did was  
13 since reactors were higher compared to all  
14 monitored workers, we broke out all the  
15 reactor workers and looked at construction  
16 trades workers at the reactor. And all the  
17 monitored workers at the reactor. And did  
18 that comparison. And again we saw no  
19 difference between construction trades workers  
20 and the monitored reactor area workers.

21 So the results of this are that

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1 for tritium, we don't see a significant  
2 difference, for which would warrant or require  
3 a separate coworker model for construction  
4 trades workers. That's not to say, again, if  
5 we go to uranium or plutonium, that we won't  
6 see a difference because we very well might.  
7 But for tritium, we don't see that difference.

8 What I would like is to try and  
9 get the Board's agreement of buy-in to this  
10 type of methodology of comparing the geometric  
11 mean and geometric standard deviation in a  
12 permutation type of test, as we've done here,  
13 as a basis for making this type of  
14 determination.

15 If we don't agree on a method,  
16 we're not -- when we get to uranium,  
17 plutonium, and the others, we're never going  
18 to agree. And we're always going to be  
19 comparing apples and oranges. And so that was  
20 why I was wanting to bring this up and discuss  
21 this particular method with you all.

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1 DR. MAKHIJANI: Well, we began  
2 reviewing this report. And but haven't  
3 finished it. And if the Work Group's  
4 direction is that we should focus on a method,  
5 we will do that rather than, you know -

6 (Simultaneous speaking.)

7 DR. MAKHIJANI: We'll certainly  
8 review the report and give you -- so we are in  
9 the process of review. We've begun that. And  
10 I've got to work with Harry on it.

11 DR. TAULBEE: But also try to --

12 DR. MAKHIJANI: We did our own  
13 report, as you know, which was -- which  
14 basically used the larger new tritium dataset  
15 and we applied the same type of analysis that  
16 we had done earlier. And came up with the  
17 same conclusions because it was a larger --  
18 similar conclusions. Am I stating that right,  
19 Harry?

20 DR. CHMELYNSKI: Yes, Arjun. I  
21 think there is very little difference in the

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1 results with the new data.

2 DR. TAULBEE: Okay.

3 DR. MAKHIJANI: So our report did  
4 not add some thing that was materially new to  
5 our prior analysis. It was just that we used  
6 the larger database, as NIOSH had generated  
7 this database.

8 So I have a few questions -- so  
9 we're still developing our analysis. And  
10 we'll certainly develop it.

11 CHAIRMAN GRIFFON: Yes, but I  
12 think that --

13 DR. MAKHIJANI: Did you calculate  
14 the doses or were they in the records? Or is  
15 there -- I didn't see a spreadsheet with these  
16 doses. I didn't see the underlying database  
17 that you used for this analysis. And  
18 certainly we'll need that.

19 DR. TAULBEE: The doses are there  
20 in that spreadsheet that we provided to you  
21 all.

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1 CHAIRMAN GRIFFON: Okay.

2 DR. MAKHIJANI: I was just looking  
3 to see whether -- Harry, do you have it?

4 DR. CHMELYNSKI: Arjun, no, I've  
5 been working with the summary statistics that  
6 they had in their report so far.

7 DR. MAKHIJANI: Yes, we have --

8 CHAIRMAN GRIFFON: You know -- I  
9 see tritium dose two, is the --

10 DR. TAULBEE: Tritium dose two?

11 DR. MAKHIJANI: Which part of the  
12 O: drive is it in?

13 CHAIRMAN GRIFFON: In the AB  
14 documents review under SRSDCASDOCS.

15 DR. MAKHIJANI: Tritium  
16 description of files, is that it?

17 CHAIRMAN GRIFFON: Yes, under  
18 that, under tritium.

19 DR. MAKHIJANI: And which file is  
20 it?

21 CHAIRMAN GRIFFON: The last

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1 spreadsheet on the bottom, tritium dose two.

2 DR. MAKHIJANI: Is that the one?

3 Tritium dose two?

4 CHAIRMAN GRIFFON: Apparently

5 that's the one, right.

6 (Laughter.)

7 DR. MAKHIJANI: So you calculated

8 all the doses for these workers?

9 DR. TAULBEE: Yes.

10 DR. MAKHIJANI: And so question is

11 --

12 DR. TAULBEE: It's easy to do.

13 DR. MAKHIJANI: Well, yes, it's

14 easy to do if you simply assume it's tritiated

15 water. But there's a separate matrix item on

16 tritides. And so -- I mean I have a big

17 question as to the value of calculating doses

18 when we know that we have omitted a very

19 significant action item in calculating doses

20 and comparing doses.

21 I mean some of these people were

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1 exposed to tritides. And the bioassay data  
2 are going to have to be appropriately  
3 interpreted. And we haven't gotten that  
4 interpretation from NIOSH. And so this seemed  
5 a little bit like jumping the gun and saying  
6 okay, we're going to assume it is all  
7 tritiated water and compare the doses when  
8 we're not actually comparing the doses.

9 So it's a --

10 CHAIRMAN GRIFFON: Go ahead.

11 DR. TAULBEE: I mean the vast  
12 majority of the exposures at Savannah River  
13 are due to tritiated water and HTO. I know  
14 you're shaking your head there.

15 DR. MAKHIJANI: No, I understand.  
16 I don't disagree with this. I completely  
17 agree.

18 DR. TAULBEE: And so there are a  
19 few operations in certain areas in latter time  
20 periods primarily, in the post-1986 time  
21 period, for which there would be some

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1 potential for tritide-type doses.

2                   However, the extreme solubility  
3 forms -- well, actually they haven't quite  
4 been established yet -- but in general,  
5 they're not the extreme solubility forms. So  
6 I believe these doses are very -- are quite  
7 representative of the actual dose to these  
8 workers.

9                   DR. MAKHIJANI: I'm just pointing  
10 this out. I mean we can go ahead and review  
11 this as given. But I'm pointing out that  
12 until this tritide question is resolved, I  
13 think there will be some kind of a cloud over  
14 this analysis because you -- we haven't  
15 identified the tritide-exposed population.

16                   We've still got outstanding  
17 solubility questions that you say you're doing  
18 experiments on. At least the last time we had  
19 a Work Group meeting, there were experiments  
20 going on at Savannah River Site to establish  
21 their solubility.

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1 DR. TAULBEE: Those are all post-  
2 1980 to 1990s.

3 DR. MAKHIJANI: Well, I personally  
4 have seen a definitive timeline on these.  
5 And, you know, we've often had timeline type  
6 of issues. And we haven't reviewed a timeline  
7 on it. We've reviewed nothing -- no formal  
8 document on tritides.

9 Now I'm perfectly willing to go  
10 ahead and review the document as is. But in  
11 my opinion, it is an open question whether we  
12 should be using at this stage, bioassay data  
13 or dose data to establish this type of  
14 methodology.

15 I think we've done all of our work  
16 on bioassay data in the absence -- and we  
17 compare bioassay data without knowing the  
18 solubility, right? We generally say that the  
19 -- in my opinion, it's safer to do a bioassay  
20 analysis because we leave it to NIOSH once  
21 that bioassay is accepted as a satisfactory

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1 dose reconstruction basis and there are no  
2 other issues.

3 But NIOSH will simply use the  
4 claimant-favorable solubility so that if you  
5 are comparing -- if you are comparing  
6 construction workers to the non-construction  
7 workers, I would suggest that the more robust  
8 approach in the absence of a piece of paper  
9 that we can review on tritides and  
10 construction workers versus non-construction  
11 workers, that it is more robust to rely on  
12 bioassay data because the rest is simply --  
13 once you agree on that, the rest is a dose  
14 reconstruction detail and not an SEC matter in  
15 my opinion.

16 CHAIRMAN GRIFFON: Can I ask --  
17 I'm just curious why you decided to go to  
18 dose. I know it is an easy step but the raw  
19 data was urinalysis. Why did you decide to do  
20 this analysis in dose?

21 DR. TAULBEE: Because you run into

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1 the issue of one individual worker having --  
2 let's say he has an intake that's a very high  
3 dose. He will have 100 bioassay samples in a  
4 given year. And whereas somebody else who is  
5 lower might have, you know, one per month.  
6 And so you're dominating then by this one  
7 large dose, which you can roll into a large  
8 dose and use as an individual worker.

9 The alternative is if you go to  
10 the bioassay, you have to apply some method  
11 such as highest sample -- highest bioassay  
12 sample of the year to get away from this  
13 situation where you have effectively  
14 correlated data because, you know, as the  
15 person gets the intake and they're being re-  
16 sampled and re-sampled and re-sampled, these  
17 are all correlated. And so then your analysis  
18 is really looking at a whole bunch of  
19 correlated data.

20 To get away from that, then you  
21 have to take that high sample. We can do

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1 that. I mean we can go back and re-analyze  
2 this, taking that highest sample for each  
3 person for the year and using that in the  
4 analysis if you want. But there's no other  
5 way to get around that correlated data issue  
6 of all of these multiple bioassay samples for  
7 a given person.

8 DR. MAKHIJANI: I guess a factual  
9 point. Normally when you've done coworker  
10 models, you haven't calculated the doses  
11 assuming solubilities and so on. You use the  
12 bioassay data and use the 84th percentile or  
13 whatever. And you use the whole data -- it's  
14 just a point of information. I'm kind of  
15 puzzled as to why this is a special case.

16 MS. BRACKETT: This is Liz  
17 Brackett. It's true that for most coworker  
18 studies we do start with the bioassay data and  
19 do the statistical analysis on that. But if  
20 you look at all of our tritium studies, we  
21 take the bioassay data, calculate doses, and

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1 then do the coworker study on the doses.

2 DR. MAKHIJANI: Okay. All right.

3 Fair enough.

4 CHAIRMAN GRIFFON: But why -- I  
5 guess your first question still holds though.

6 Why for tritium? Why not -- because it would  
7 be the same issue for other nuclides, wouldn't  
8 it?

9 DR. TAULBEE: Liz, go ahead.

10 MS. BRACKETT: Well, the reason  
11 that we do that is because we had discussions  
12 early on among all interested parties that, in  
13 fact, we all agreed that the best way to do a  
14 coworker study would be to have doses for  
15 people.

16 But we also realized that that's  
17 not possible to do for things like uranium,  
18 plutonium. But it is for tritium for a number  
19 of reasons. Because tritium, your data are  
20 mostly independent. If you have a result from  
21 an intake that -- it clears out of the body

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1 rapidly. So when you take another sample, you  
2 know, a few months later, you're not still  
3 excreting the material from the earlier  
4 intake.

5           Whereas with the other nuclides,  
6 you are. So there is a problem saying that a  
7 specific result is representative of a  
8 specific point in time. And you can also  
9 automate the calculation of tritium intakes.  
10 To some extent, you can just, you know,  
11 essentially connect the dots and calculate the  
12 area under the curve. And that doesn't work  
13 very well for the longer-lived nuclides.

14           And so when we did our first  
15 tritium coworker study, we thought that since  
16 we could do it, that it would be a better  
17 method for doing the assessment when assuming  
18 HTO.

19           CHAIRMAN GRIFFON: That makes  
20 sense, Liz. Thanks, yes. And then the  
21 question I would have is in considering the

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1 application, SC&A should consider the  
2 application as modeled to other nuclides. I'm  
3 assuming that for other nuclides, you would  
4 have to use the bioassay, not dose.

5 So you should consider that when  
6 you're considering whether you think this  
7 approach will work for the other models.  
8 That's what Tim is asking, right? That we  
9 consider that before you --

10 DR. TAULBEE: Sure, yes.

11 DR. MAKHIJANI: Well, from I heard  
12 Liz say is that the other coworker models are  
13 not going to be for dose.

14 CHAIRMAN GRIFFON: That's correct.  
15 That's what I just said.

16 DR. NETON: It's this permutation  
17 test, I think, that is --

18 DR. MAKHIJANI: Right.

19 CHAIRMAN GRIFFON: But I said how  
20 would that affect this statistical model is  
21 what I guess I'm asking.

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1 DR. MAKHIJANI: Yes, right.

2 CHAIRMAN GRIFFON: You know that's  
3 what I'm asking is that SC&A consider that  
4 when you respond to that question will this  
5 model be useful for these other nuclides. It  
6 won't be dose any more. It will be urinalysis  
7 results.

8 So there's two parts of this  
9 question. I'm less interested in the first  
10 actually because it sounds like you came up  
11 with a similar result using your own analysis  
12 that the tritium could be -- was bounding of  
13 the construction workers, right?

14 DR. MAKHIJANI: No, I think --

15 CHAIRMAN GRIFFON: Oh, I thought I  
16 heard Harry say that.

17 DR. MAKHIJANI: Harry, can you  
18 summarize our results from our study?

19 DR. CHMELYNSKI: We did a  
20 completely different study than the one that  
21 was just discussed.

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1                   First off, we did look at the  
2 bioassay data. And the model that has been  
3 discussed so far takes the approach of  
4 comparing certain subgroups of workers to a  
5 set of all workers.

6                   This approach sort of hides any  
7 differences between construction workers and  
8 non-construction workers because when you  
9 compare the construction workers strata to all  
10 workers, there are a lot of construction  
11 workers in the all workers. So it is a  
12 confounded kind of situation to begin with.

13                   What we did was actually separate  
14 the two populations and compare them. The  
15 non-construction workers in each area were  
16 compared to all the construction workers. And  
17 to look for area by area differences. And  
18 then the construction workers were compared to  
19 the non-construction workers to look at those  
20 differences. And finally we looked at the  
21 various trades of construction workers and

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1 what differences we could see amongst those.

2 When we do this, we find there are  
3 some large differences. Now one of the  
4 problems with the model we just heard is that  
5 the conclusion is well, we didn't see any  
6 significant differences. Now that can be due  
7 to a lot of reasons. One is simply because  
8 there is just so much variation in the  
9 population that almost no group could be  
10 determined to be different because of the huge  
11 variances.

12 There has been some argument  
13 presented that the model does have some power.

14 For example, it does have the power to detect  
15 the difference between reactor workers and the  
16 group of all workers, which, again, I'll point  
17 out has in it a lot of reactor workers.

18 But -- and then we also heard that  
19 well, when you compare the reactor  
20 construction workers with the other reactor  
21 workers, we don't see any difference. If you

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1 put those two studies together, what it really  
2 says is that the construction reactor workers  
3 are significantly higher than the group of all  
4 workers. But yet we don't see that result  
5 presented because the reactor construction  
6 workers were only compared to the other  
7 reactor workers. They were never compared to  
8 a larger group.

9 When we look at these comparisons,  
10 we do see differences. And we did it with the  
11 bioassay data so it is hard to compare and  
12 account for the differences in our results  
13 with the results that NIOSH has presented.  
14 But my own gut feeling is that the results of  
15 the comparison of the coworker model never  
16 does tell you how far off the estimates are.

17 That's one of the things that we  
18 try to quantify. Are we looking at factors of  
19 two, three, four, five, et cetera? And I'd  
20 like to see that sort of approach incorporated  
21 in the current analysis of the parametric --

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1 I'm sorry, the permutation test.

2 CHAIRMAN GRIFFON: Well,  
3 apparently this action does have to go to  
4 NIOSH -- or to SC&A. But the question I would  
5 have is could you -- because I had the same  
6 sort of question about the, you know,  
7 comparing construction workers to the whole  
8 population where the whole population contains  
9 construction workers.

10 I'm wondering if looking at the  
11 spreadsheet of data if SC&A will be able to do  
12 a similar analysis that they did with the  
13 bioassay data using your dose data. And I'm  
14 not sure the information is there.

15 DR. MAKHIJANI: It is not there.

16 CHAIRMAN GRIFFON: Because you  
17 only have area name and construction worker  
18 yes or no, right? You don't have --

19 DR. MAKHIJANI: Right. And  
20 there's no job types among construction.

21 CHAIRMAN GRIFFON: Right. Right.

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1 DR. MAKHIJANI: As the data  
2 stands, taking -- just opening the spreadsheet  
3 and taking a quick look --

4 CHAIRMAN GRIFFON: Right.

5 DR. MAKHIJANI: I do not believe  
6 that we could do a parallel analysis.

7 Harry, do you agree? We're doing  
8 realtime science here.

9 DR. CHMELYNSKI: I'd have to defer  
10 on that. I don't have the spreadsheet in  
11 front of me.

12 DR. MAKHIJANI: Oh, okay. Yes, in  
13 taking a quick look, I don't think that we  
14 can.

15 CHAIRMAN GRIFFON: That would be  
16 my concern. So then, you know, if you're  
17 going to come back with those kinds of  
18 comments without being able to do the  
19 analysis, we could just go around on this, you  
20 know.

21 DR. MAKHIJANI: This is likely.

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1                   CHAIRMAN GRIFFON:    I want to try  
2                   to close this, you know, somehow.

3                   DR. TAULBEE:       One of the things  
4                   that Harry mentioned was that, you know, in  
5                   this case, construction trades workers make up  
6                   a significant fraction of the all monitored  
7                   workers. We did a separate analysis comparing  
8                   construction trades workers with the non-  
9                   construction trades workers that Harry was  
10                  talking about. And that's what you see me  
11                  allude to as part two of our report.

12                  And so that's what coming --

13                  CHAIRMAN GRIFFON:    Okay.

14                  DR. MAKHIJANI:    Oh, you haven't --  
15                  we haven't seen that yet?

16                  DR. TAULBEE:       No, you have not  
17                  seen that.

18                  DR. MAKHIJANI:    Okay.

19                  CHAIRMAN GRIFFON:    Okay. So you  
20                  have looked at that?

21                  DR. TAULBEE:       Yes, we did.

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1 CHAIRMAN GRIFFON: Okay.

2 DR. TAULBEE: But we looked at it  
3 under these same strata.

4 CHAIRMAN GRIFFON: yes.

5 DR. TAULBEE: The exact same  
6 strata of construction trades versus non-  
7 construction trades.

8 CHAIRMAN GRIFFON: Right.

9 DR. TAULBEE: And reactors versus  
10 all other areas. And then construction trades  
11 at reactors versus all other -- or non-  
12 construction trades at reactors. So that  
13 analysis --

14 CHAIRMAN GRIFFON: Refresh my  
15 memory because we have some experts in the  
16 back of the room here on this, but refresh my  
17 memory on how you identify construction  
18 workers from the job types. I know you've  
19 probably discussed this before in our Work  
20 Group, but I've probably forgotten. So I  
21 apologize if I -- how did you -- what job

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1 types -- how did you categorize --

2 MR. MAHATHY: We -- earlier in the  
3 month -- we picked all trades that would be  
4 involved in the broader definition of  
5 construction trades like welder, painter --  
6 and there is a list, I think.

7 CHAIRMAN GRIFFON: Is that listed?  
8 Yes, where is that list?

9 MR. MAHATHY: I think we supplied  
10 that to you --

11 DR. TAULBEE: It's in that same --

12 CHAIRMAN GRIFFON: In that  
13 document?

14 DR. TAULBEE: -- directory.

15 CHAIRMAN GRIFFON: In the  
16 directory?

17 DR. TAULBEE: Yes, we provided  
18 that as the background when we presented the  
19 files to you. We have a list of all the job  
20 titles that we considered as construction  
21 trades.

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1 CHAIRMAN GRIFFON: Okay.

2 DR. TAULBEE: And these are --  
3 admittedly, here, these are self reported.

4 MR. MAHATHY: Right.

5 DR. TAULBEE: So these are what  
6 people put --

7 CHAIRMAN GRIFFON: Just to be  
8 clear here, description of files, that folder?

9 DR. TAULBEE: That's correct.

10 CHAIRMAN GRIFFON: And what is the  
11 name of it? Tritium Dose in HTO Coworker  
12 Data?

13 DR. TAULBEE: Yes, it's the Word  
14 file.

15 CHAIRMAN GRIFFON: The Word file?  
16 Okay. That's the Word file?

17 DR. TAULBEE: Yes, that one.

18 DR. MAKHIJANI: Just to give you a  
19 little vignette from our report, if you look  
20 at -- sorry --

21 CHAIRMAN GRIFFON: I'll get there

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1 in a second. This isn't publicly out, is it  
2 yet, this document?

3 DR. TAULBEE: No, I don't think  
4 so. It's just for the Work Group what we put  
5 here.

6 DR. MAKHIJANI: What document are  
7 we talking about?

8 DR. TAULBEE: That file name.

9 CHAIRMAN GRIFFON: The HTO Coworker  
10 Data -- something -- it's a Word document in  
11 that tritium description folder.

12 DR. MAKHIJANI: Okay.

13 CHAIRMAN GRIFFON: There's only --  
14 there's one Word document in there.

15 DR. MAKHIJANI: Okay.

16 DR. TAULBEE: One of the other  
17 things that --

18 CHAIRMAN GRIFFON: It's about page  
19 -- down a little ways -- page -- well, it  
20 starts on page five, job titles used with CTW.

21 DR. TAULBEE: One of the other

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1 things within the report, too, that is coming  
2 is that Tom and Daniel did separate analysis  
3 with that construction trades and non-  
4 construction trades.

5 And the analysis that Daniel did  
6 was a non-parametric whereas Tom did the  
7 parametric analysis -- parametric meaning we  
8 fit a log-normal distribution to it beforehand  
9 and compared the parameters. Daniel did a  
10 non-parametric analysis of that same data set.

11 And their two results agreed.

12 So this was kind of a benchmark,  
13 if you will, of the Monte Carlo permutation  
14 test for us, that whether we do a parametric  
15 or non-parametric, we'll get the similar  
16 results. And so that's all in that particular  
17 report. So you'll actually see the dual  
18 analysis of construction trades versus non-  
19 construction trades.

20 CHAIRMAN GRIFFON: How did you --  
21 this is still back to my job title question.

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1 How did you -- and I don't know if this  
2 happened at all, but were there instances  
3 where people went -- had combined job titles?  
4 Construction -- non-construction?

5 MR. MAHATHY: Oh, yes. A good  
6 question. If they said they were a  
7 construction worker, then we put them in as a  
8 construction worker regardless of when they  
9 were a construction worker.

10 CHAIRMAN GRIFFON: Also self-  
11 reported, you're right. Okay.

12 DR. MAKHIJANI: Were there a lot  
13 of examples where workers went from  
14 construction workers to the operations side  
15 because I know in our interviews --

16 CHAIRMAN GRIFFON: -- what I was  
17 asking, yes.

18 DR. MAKHIJANI: Yes. And in our -  
19 - and the reason I'm raising it is in our  
20 interviews, we did come across -- in another  
21 report we either submitted or that is at DOE

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1 for review or something, some issue came up  
2 about, you know, differences in monitoring  
3 practices between the time somebody was a  
4 construction worker and the time they  
5 transferred to operations.

6 DR. TAULBEE: Yes, when we know  
7 that they transferred.

8 DR. MAKHIJANI: Was this a --

9 CHAIRMAN GRIFFON: You mean if  
10 someone was a --

11 DR. MAKHIJANI: -- common thing  
12 that some people transferred from construction  
13 workers to operations?

14 CHAIRMAN GRIFFON: I'm going to  
15 let Bill McGowan because --

16 MR. MCGOWAN: Yes, there are --

17 MR. KATZ: Bill, if you could come  
18 to the table just for this so the mic can pick  
19 you up? Thanks.

20 MR. MCGOWAN: At all the sites  
21 that we're familiar with, which is most of

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1       them, construction workers also worked at  
2       production jobs. And they also worked as  
3       escorts because they had clearances.

4                   CHAIRMAN GRIFFON:     And, Bill, I  
5       mean your background involvement was some  
6       research studies from the University of  
7       Cincinnati.

8                   MR. MCGOWAN:     Yes, I'm at -- I  
9       worked at the University of Cincinnati. I  
10      worked in the former worker project. And I'm  
11      also working with the Department of Labor on  
12      the EEOICPA claims.

13                   So I'm familiar with that. I've  
14      done interviews myself at Oak Ridge. And  
15      we've also worked on institutional history  
16      databases for a number of the sites. And  
17      we've both worked on Savannah River so that's  
18      why we're familiar with this because it did go  
19      back and forth.

20                   CHAIRMAN GRIFFON:     All right.  
21      Appreciate it.

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1 MR. MCGOWAN: May I ask a  
2 question?

3 CHAIRMAN GRIFFON: Yes.

4 MR. MCGOWAN: Did I hear a number  
5 of only 22 construction workers in your  
6 sample?

7 DR. TAULBEE: No, 33 in 1954.

8 MR. MCGOWAN: There were enormous  
9 numbers of construction workers at the site at  
10 that time.

11 DR. TAULBEE: Let me give you a  
12 little background of our data set. Our data  
13 set consists of all of the people who have  
14 filed claims under EEOICPA.

15 MR. MCGOWAN: All of your  
16 claimants.

17 DR. TAULBEE: That's right. And  
18 so we coded all of their data and -- which is  
19 why in 1954, we have such a small sampling  
20 that we're monitoring for tritium. It gets  
21 much larger in later years.

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1 CHAIRMAN GRIFFON: Thanks, Bill.

2 Yes, so that was one of my  
3 concerns was that they switched from  
4 construction worker jobs to non-construction  
5 and you have -- you know, how did you then  
6 separate them when you did your analysis? You  
7 didn't include them or you --

8 DR. TAULBEE: We included them as  
9 construction trades workers.

10 CHAIRMAN GRIFFON: Okay. All  
11 right. That could be another -- if it was  
12 very common -- I don't know how common it was  
13 but -- all right.

14 DR. MAKHIJANI: Just to give you a  
15 little vignette from our report as to how you  
16 get these results that are very, very  
17 different, so if you look at the ratio of the  
18 84th percentile -- in our report, it's a PDF  
19 page 30, table 2-6. If you look at the F area  
20 at -- which is the reprocessing high-level  
21 waste area, one of them, in the 1950s, the

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1 ratio of the 84th percentile of the bioassay  
2 for construction workers and non-construction  
3 workers was 7.3. And in the 1960s, it was  
4 0.13.

5 So it gives you an idea of the  
6 range for the same area and the same parameter  
7 that we're calculating. There are, you know,  
8 a 50, 60-fold difference in the result. And  
9 the other results are in between but they are  
10 also pretty variable.

11 And you can see if you go down --  
12 if you go down this list, you'll see typically  
13 that from one decade to the next -- and partly  
14 it depends on how you are aggregating these  
15 things -- if you aggregate them every year --  
16 we chose to aggregate by decade because you  
17 get, you know, over a decade the processes  
18 don't vary very much and you get a larger  
19 number of data points and a more robust  
20 comparison.

21 It's a tradeoff, you know,

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1 obviously, you know, there is a value to doing  
2 it by year. So I'm not criticizing what you  
3 did. It's just that we felt that you get a  
4 more robust result if you compare by decade.

5 MR. STANCESCU: Just to say here  
6 we did the analysis by year for the dose, and  
7 our analysis found the periods for the trade  
8 workers when there were significant  
9 differences. We didn't do it by decade. But  
10 I'm pretty sure if we look at it by decade, we  
11 don't see any difference.

12 DR. MAKHIJANI: Right.

13 MR. STANCESCU: So there were a  
14 few years when we see the difference. If you  
15 do it like you did by decade, we'll see  
16 totally different.

17 DR. MAKHIJANI: Yes, you'll see  
18 less of a difference. I agree with you.

19 DR. TAULBEE: One of the concerns  
20 I have with just comparing the ratio of the  
21 84th percentile is that variability --

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1 DR. MAKHIJANI: We did more than  
2 that. We did GSDs, too. So I mean take a  
3 look at the report. It's a fairly involved  
4 report.

5 I just wanted to give you a  
6 vignette of the kind of results that we have  
7 and why we felt that it was important to parse  
8 the worker population, construction worker  
9 versus non-construction workers, for one  
10 thing. We've done all of the comparisons,  
11 construction workers to construction workers  
12 by periods and areas and job types.

13 So I think it really does -- if  
14 we're going to look people in the eye and say  
15 we know for you this is a bounding dose, and  
16 we find that pipefitters are very different  
17 than electricians because they were in there,  
18 in the reactors, fixing the pipes that were  
19 carrying tritiated water, I personally think  
20 that analysis by trade is very important.

21 It's not enough to say reactor

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1 workers because the guy who was working with  
2 the electrical equipment is going to be very  
3 different than the guy that is fixing a  
4 leaking pipe. It's going to be different.

5 DR. TAULBEE: The effect of what  
6 it is that you are asking -- and I'm not -- I  
7 don't have an opinion of whether we should or  
8 should not separate by trades, is that, a, it  
9 complicates the dose reconstruction  
10 significantly is one issue with that.

11 Number two is for pipefitters  
12 then, let's say that we redo the model, we  
13 separate out pipefitters from everybody else.

14 Virtually everybody else's doses are going to  
15 go down, pipefitters will go up. However, if  
16 you look at the actual work that was going on,  
17 those pipefitters that were working around  
18 those reactors, I can almost -- I can't 100  
19 percent guarantee, but I'm 95 percent sure we  
20 would have monitoring data for them and they  
21 wouldn't be -- we wouldn't be applying this

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1 coworker model to them.

2           The coworker model is applied to  
3 the unmonitored workers. And when you  
4 separate out those people, then effectively  
5 you are going to be assigning a lower dose.  
6 And if that's the guidance, okay. We can do  
7 that. But it's, you know, something I think  
8 you all should consider.

9           DR. MAKHIJANI: Well, you know, we  
10 haven't addressed completeness of monitoring  
11 data as yet. And typically we found that  
12 completeness and adequacy varies a lot by  
13 period, even for well-monitored radionuclides.

14           And when we've kind of put a fine  
15 point on it and actually gone into the fine  
16 print and the data, it isn't always a happy  
17 result that every, you know, the most exposed  
18 workers have consistent monitoring data  
19 through the period of operation, at least to -  
20 - I think it is a question that doesn't have  
21 an automatic answer the way it is being

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1 suggested.

2           The -- it may be that in certain  
3 periods, pipefitters were very well monitored,  
4 and in other periods, they were not. It is an  
5 issued that we haven't -- we haven't settled  
6 this basic question as to who we're looking at  
7 and how we're looking at them before we settle  
8 this question.

9           So we look at -- if we agree that  
10 pipefitters were, say -- or some other  
11 category, I'm just using pipefitters because  
12 memory from the TIB-52. And I think there is  
13 some data in here to that effect, too, that  
14 boilermakers or pipefitters were among the  
15 more exposed category, naturally you might go  
16 there if you're doing a coworker model to use  
17 that for the bounding dose. So there is a  
18 real value to doing that so that you're not  
19 underestimating the doses of unmonitored  
20 workers.

21           Now if you can show, of course,

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1 that all pipefitters were monitored properly  
2 throughout the period, then that question  
3 wouldn't arise.

4 DR. TAULBEE: I think we possibly  
5 could do that here at Savannah River for  
6 tritium. But to uranium, plutonium, and the  
7 others, I doubt that we could robustly  
8 identify that, you know, all the construction  
9 trades were monitored at a high degree. But  
10 tritium was so simple to monitor, and they did  
11 so much of it --

12 CHAIRMAN GRIFFON: And cheap.

13 DR. TAULBEE: And cheap -- you  
14 know, really cheap is the bottom line -- and  
15 then, I think, with tritium, with this  
16 analysis, I think it holds. Around the  
17 reactor areas, it was simple to do, and they  
18 did it. They had millions of samples.

19 CHAIRMAN GRIFFON: Do you have any  
20 statistics on that? When you compile all this  
21 data, do you have any statistics on how

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1 complete it was for the claimants that you  
2 used to put the database together?

3 DR. TAULBEE: For total number of  
4 --

5 CHAIRMAN GRIFFON: Yes, like  
6 overall, how many -- how many people were --  
7 would need the coworker model to reconstruct  
8 dose. You know we've had that kind of thing  
9 brought up before, that there's only 50 people  
10 that this would even be used for, you know,  
11 that kind of thing.

12 DR. TAULBEE: Well, in general,  
13 for tritium at Savannah River, you know --  
14 actually I don't have that number off the top  
15 of my head. I'm sorry.

16 CHAIRMAN GRIFFON: No? Small,  
17 large, you don't --

18 DR. MAKHIJANI: Harry, do we know  
19 how many like laborers there were in the 19 --

20 DR. TAULBEE: Somewhere on the  
21 order of like 60 -- 50, 60 percent were

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1 monitored of our claimants, but I don't --

2 CHAIRMAN GRIFFON: Okay, okay,  
3 yes.

4 DR. TAULBEE: Somewhere in there.

5 CHAIRMAN GRIFFON: All right.

6 DR. MAKHIJANI: We've got the  
7 number of tritium samples cataloged for  
8 construction workers by job type on page 64,  
9 table C-1. But what I'm not finding very  
10 easily is do we have the number of workers in  
11 each job type for the decade. Harry, do we  
12 have that in some table?

13 DR. CHMELYNSKI: I'm looking for  
14 it now. I'm not sure.

15 DR. MAKHIJANI: So I think we do  
16 have the number of samples and by, you know,  
17 they are very variable by decade and by job  
18 type. But I don't have the number of workers  
19 in each category.

20 DR. TAULBEE: Yes, 3,200 samples  
21 in 1960 of pipefitters. That could be

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1       comprised of a much smaller number of  
2       pipefitters.

3                   DR. MAKHIJANI:     Oh, undoubtedly,  
4       yes.

5                   DR. TAULBEE:     It was a multiple  
6       sampling.

7                   DR. MAKHIJANI:     Yes, undoubtedly,  
8       yes.   That's why I say we need the number of  
9       workers in each category in each decade.

10                  DR. TAULBEE:     I think you would  
11       also have to look at the areas as well from  
12       that standpoint.

13                  DR. MAKHIJANI:     Yes, we've done  
14       that.

15                  DR. TAULBEE:     Well, I mean the two  
16       together.

17                  DR. MAKHIJANI:     Yes.   Yes.   Then  
18       you run into data size problems -- sample size  
19       problems.

20                  DR. TAULBEE:     Exactly.     Which  
21       brings me to another question that I have for

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1 you. I know you combined by decade for  
2 purposes of robustness or to increase your  
3 sample size. But I'm not sure that that's --  
4 when we do our coworker models, I can't -- and  
5 Liz, correct me if I'm wrong, but I can't  
6 think of a single time we've developed a  
7 coworker model that combined years together.

8 DR. NETON: Oh, we have.

9 DR. TAULBEE: We have?

10 MS. BRACKETT: We have combined  
11 some although we get feedback that we should  
12 not be doing that. We have gone up to five  
13 years at a time, never more than five. And we  
14 try to avoid that as much as possible.

15 DR. TAULBEE: So, you know, it  
16 seems to me I understand your point of this.  
17 But if we've gotten feedback from the Board or  
18 SC&A that we shouldn't be combining by more  
19 than five years, then it seems like, you know,  
20 your benefit that you're talking about here,  
21 maybe you should break it down into five-year

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1 increments.

2 DR. MAKHIJANI: Well, we can  
3 certainly do that. I don't know the value of  
4 re-analyzing this particular set. I mean  
5 we're certainly happy to do it.

6 CHAIRMAN GRIFFON: I'm trying to  
7 sort out a path forward.

8 DR. MAKHIJANI: And me, too, I'm  
9 just trying to, you know --

10 CHAIRMAN GRIFFON: I'm listening  
11 still, but we --

12 DR. MAKHIJANI: We've spent a lot  
13 of time and effort on this. And NIOSH has  
14 spent a lot of time and effort.

15 CHAIRMAN GRIFFON: Right.

16 DR. MAKHIJANI: And I think it  
17 would be good if we could figure out --  
18 because right now it may be better to focus on  
19 reviewing NIOSH's work --

20 CHAIRMAN GRIFFON: Yes.

21 DR. MAKHIJANI: -- except that we

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1 cannot come up with a parallel analysis. We  
2 just don't have the data to show whether what  
3 we believe is the proper approach to  
4 addressing construction workers --

5 CHAIRMAN GRIFFON: But perhaps we  
6 do have the data. I mean maybe the  
7 spreadsheet may not be all that exists. Do  
8 you -- you know, for instance, on these, there  
9 is this table that you have here. Is there  
10 more underlying data that you can say --

11 DR. TAULBEE: Let me ask --

12 CHAIRMAN GRIFFON: -- you know,  
13 you have ID numbers so I'm assuming you might  
14 be able to pull the individual --

15 DR. TAULBEE: Would you be able to  
16 categorize --

17 CHAIRMAN GRIFFON: -- link job  
18 titles in there?

19 DR. TAULBEE: -- those -- that  
20 spreadsheet, you know, where we separated  
21 construction trades and non-construction

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1 trades-types of decision and actually  
2 categorized them into one of these crafts?  
3 Would that be possible?

4 MR. MAHATHY: I could do -- I mean  
5 I could tell you the so-called crafts that I  
6 did and put them into one of those, yes.

7 DR. TAULBEE: Okay.

8 CHAIRMAN GRIFFON: What does that  
9 mean, the so-called crafts that you did?

10 MR. MAHATHY: Well, you know, I'm  
11 just saying, you know, I used -- you know,  
12 they are self-reported crafts.

13 CHAIRMAN GRIFFON: That they  
14 reported?

15 MR. MAHATHY: Yes.

16 CHAIRMAN GRIFFON: Yes, yes, okay.

17 I mean if you could add a column with crafts  
18 for that --

19 MR. MAHATHY: Yes, I can do that.

20 CHAIRMAN GRIFFON: -- spreadsheet,  
21 if it's not --

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1 MR. MAHATHY: Sure, I can do that.

2 CHAIRMAN GRIFFON: -- I mean,  
3 then, Arjun, you guys can look at the report  
4 but also consider explaining the techniques  
5 that you used.

6 DR. MAKHIJANI: Yes.

7 CHAIRMAN GRIFFON: I think that's  
8 the path forward.

9 DR. MAKHIJANI: Yes. There would  
10 remain one caveat in that in our analysis, we  
11 found that the reprocessing and high-level  
12 waste areas were some of the areas with the  
13 highest ratios. And in this we don't have  
14 those areas broken out.

15 So we can do a partially  
16 comparable analysis, certainly, if we had  
17 that.

18 CHAIRMAN GRIFFON: Yes.

19 DR. TAULBEE: How did you break  
20 those areas out in your analysis?

21 DR. MAKHIJANI: F Area, H Area.

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1 MR. MAHATHY: I thought --

2 DR. TAULBEE: Okay. We have F and  
3 H Area.

4 MR. MAHATHY: I thought we did  
5 that, too, yes.

6 CHAIRMAN GRIFFON: Oh, you have  
7 that.

8 DR. TAULBEE: I'm sure we did in  
9 that spreadsheet. I think I just separated  
10 out reactors from there.

11 DR. MAKHIJANI: Oh, so you have  
12 some. You have some -- I do see there are  
13 some F Area, H Area.

14 DR. TAULBEE: Okay. And if  
15 they're on the spreadsheet --

16 DR. MAKHIJANI: Yes, they are  
17 entered here. Yes. Then we could do it. I  
18 don't know how many points there are, but  
19 we'll have to -- yes, I think we would be able  
20 to do that. Obviously we need to look at this  
21 a lot closer I know.

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1 CHAIRMAN GRIFFON: Okay. So  
2 that's the action. Did someone capture it? I  
3 mean I think the action goes to SC&A to review  
4 the NIOSH report. There is an action for  
5 NIOSH to expand that spreadsheet --

6 DR. TAULBEE: To provide crafts.

7 CHAIRMAN GRIFFON: -- including  
8 crafts.

9 DR. MAKHIJANI: NIOSH will expand  
10 spreadsheet.

11 CHAIRMAN GRIFFON: SC&A will  
12 review this report, and then SC&A will also  
13 review the tritium coworker model but also  
14 review the --

15 DR. TAULBEE: Methodology.

16 CHAIRMAN GRIFFON: -- technique,  
17 the methodology for purposes of --

18 DR. TAULBEE: The other coworker  
19 models, uranium, plutonium, et cetera.

20 CHAIRMAN GRIFFON: Et cetera. And  
21 so it's all these exotics as we call them or

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1 whatever.

2 DR. TAULBEE: Well, what I'm  
3 concerned with, that if we don't decide on a  
4 methodology, we're going to continuously do a  
5 different type of analysis.

6 CHAIRMAN GRIFFON: That's fine. I  
7 just didn't know how broadly you were thinking  
8 it could apply.

9 DR. TAULBEE: Well, the --

10 CHAIRMAN GRIFFON: Because I don't  
11 think for all these exotics, you probably  
12 don't even have any urinalysis data, do you?

13 DR. TAULBEE: We do actually.  
14 Well, for americium, curium, and californium,  
15 we have a tremendous amount.

16 CHAIRMAN GRIFFON: Okay. All  
17 right.

18 DR. TAULBEE: Savannah River --

19 CHAIRMAN GRIFFON: So for other  
20 non-dose-based models, I guess --

21 DR. TAULBEE: Yes. And there is

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1 another application that I want to bring up.  
2 And that will come out this afternoon with the  
3 neutrons as well, comparing NTA correction  
4 factors. We're comparing parameters,  
5 geometric mean, geometric standard deviation.  
6 And so those Monte Carlo permutation tests,  
7 I'm proposing to use it to basically benchmark  
8 the correction factors we've come up with. So  
9 --

10 CHAIRMAN GRIFFON: Let's bring  
11 that up later. But, yes.

12 DR. TAULBEE: Sure.

13 CHAIRMAN GRIFFON: Okay.

14 DR. MAKHIJANI: So what I have,  
15 Mark --

16 CHAIRMAN GRIFFON: Yes, read those  
17 back.

18 DR. MAKHIJANI: -- NIOSH will  
19 expand spreadsheet to provide craft data. And  
20 SC&A will review both coworker models for  
21 tritium and the method and for applicability

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1 to other radionuclides. And for the  
2 applicability of the method to other  
3 radionuclides.

4 CHAIRMAN GRIFFON: All right. And  
5 I just did a sort on those, and I don't --  
6 there are some F Area individuals identified.

7 But it looks like maybe --

8 DR. MAKHIJANI: Very few.

9 CHAIRMAN GRIFFON: -- yes, 30 or  
10 40. But anyway, that's an aside but -- all  
11 right. So I think that's our action for  
12 Matrix Item 9. Is there anything else for  
13 Item 9?

14 DR. MAKHIJANI: Harry, is there  
15 anything you wanted to add to this at this  
16 stage?

17 CHAIRMAN GRIFFON: All right. If  
18 not -- Harry?

19 DR. MAKHIJANI: He might be on  
20 mute.

21 DR. CHMELYNSKI: I'm sorry, yes.

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1 I was on mute. Thank you. I think we've  
2 covered all the topics.

3 CHAIRMAN GRIFFON: Okay.

4 DR. MAKHIJANI: Thank you, Harry.  
5 Really appreciate it.

6 CHAIRMAN GRIFFON: Then I think  
7 this is a logical point for our lunch break.  
8 And when we come back, I plan on just going  
9 back to the regular Matrix Item 2. Is that  
10 okay with everybody's schedule?

11 All right. So we'll go -- we'll  
12 start with Item 2 after lunch.

13 One o'clock, come back from lunch?

14 MR. KATZ: Okay.

15 CHAIRMAN GRIFFON: All right.

16 MR. KATZ: Thank you, everyone on  
17 the phone. And we'll restart at around one.

18 (Whereupon, the above-entitled  
19 matter went off the record at 11:56 a.m. and  
20 went back on the record at 1:08 p.m.)

21

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1 beginning.

2 So Issue No. 2, and I'm not sure  
3 who the action belonged to here.

4 DR. MAKHIJANI: It belongs to us.

5 CHAIRMAN GRIFFON: Okay. I'll let  
6 Arjun take this one.

7 DR. MAKHIJANI: Yes, we're  
8 reviewing it. We're part way through the  
9 review. Actually Joyce has a rough draft.  
10 Maybe she can give you a little peek at it.

11 And we should -- I should be able  
12 to send our review to the DOE early to mid-  
13 March. So you'll have it next month. I'm  
14 going out of the country for a couple of  
15 weeks, so -- and then we have the Board  
16 meeting. So I won't be able to attend to it  
17 until about the end of the month.

18 CHAIRMAN GRIFFON: When you say  
19 you can give us a little peek at it, can you  
20 give us any insights? Are there --

21 DR. MAKHIJANI: Well, Joyce, yes,

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1 Joyce will give you some insights.

2 CHAIRMAN GRIFFON: Yes, okay,  
3 right now. Yes, yes.

4 DR. MAKHIJANI: Because she has a  
5 rough draft.

6 CHAIRMAN GRIFFON: That would be  
7 good because if there are major things, maybe  
8 they can --

9 DR. MAKHIJANI: Right. That's  
10 what we thought.

11 CHAIRMAN GRIFFON: Thank you.

12 DR. MAKHIJANI: Is that even  
13 though they are preliminary and we're not done  
14 and I haven't really had time to review what  
15 Joyce has done --

16 CHAIRMAN GRIFFON: At least  
17 they'll be prepared --

18 DR. MAKHIJANI: Yes, right.

19 CHAIRMAN GRIFFON: All right.  
20 Joyce?

21 DR. LIPSZTEIN: Okay. I think we

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1 have some of the same problems that we had  
2 with the previous -- going until '65, we have  
3 now also for this period '65 to '71. Because  
4 the thorium work was done in a number of other  
5 areas, other than the 300-M --

6 DR. CHMELYNSKI: Ted, could you  
7 ask Joyce to move closer to a microphone?

8 MR. KATZ: Yes, she's actually  
9 pretty close.

10 DR. LIPSZTEIN: Okay. I'll try to  
11 speak louder. I'm saying that we have similar  
12 problems as with the previous analysis of  
13 thorium. Now thorium work was analyzed only  
14 for the 300 area -- actually for 313-M. And  
15 there was a lot of other areas other than the  
16 300-M area where we had the thorium work.

17 DR. TAULBEE: Can I ask which  
18 other areas?

19 DR. LIPSZTEIN: The 200 area, for  
20 example.

21 DR. TAULBEE: Okay. That one

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1 we're aware of. What are the other areas?

2 DR. MAKHIJANI: And there's also -  
3 - you had a list, right?

4 DR. LIPSZTEIN: Yes, I had a list.

5 DR. TAULBEE: It's just that she  
6 said many other areas. So I wanted to know  
7 which other ones to look at.

8 DR. LIPSZTEIN: Okay, we had 221-  
9 H, which I already said 200 area, then we had  
10 the thorium preparation campaigns in these  
11 buildings in '64, '65, '66, and '68, and '69.

12 Then we have in 773-8, we had  
13 thorium 2, which is thorium, and --

14 DR. TAULBEE: What?

15 DR. MAKHIJANI: 773-A.

16 DR. LIPSZTEIN: 773-A.

17 DR. MAKHIJANI: Then you had some  
18 other stuff there.

19 DR. LIPSZTEIN: Yes, we had in  
20 Area 735 building also.

21 DR. TAULBEE: It's also A Area?

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1 DR. LIPSZTEIN: That's what I had  
2 found -- 200 area, 700 area, and --

3 DR. TAULBEE: This was where I  
4 talked about they went into the three streams  
5 effectively with the product U-233. The  
6 thorium then was recovered to send back to  
7 Fernald. And then the mixed fission products  
8 went out to the waste tanks. So we were aware  
9 of the 200 area.

10 Part of why we didn't cover that  
11 in that particular report was it was a wet  
12 process. We felt that the oxide work was much  
13 more hazardous. And so that was why we  
14 focused on that in the 300 area.

15 Now I agree the 773, as I  
16 mentioned before, we will dig a little more  
17 into that. And I look forward to your report  
18 as to what operations you've uncovered for  
19 that area during that time period.

20 DR. MAKHIJANI: Just a caveat --  
21 we're not trying to -- we're not trying to

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1 give NIOSH a list of operations that NIOSH  
2 should look at. I mean our main comment  
3 before and after -- I mean if you tell us to  
4 do that, we'll do that. But we're not trying  
5 to cover the source terms and the periods and  
6 the building.

7 This is a sort of illustration of  
8 what shows up when you do an elementary search  
9 in the database. And without getting too  
10 detailed about it, that you come up with a  
11 number of areas.

12 As I've said, you know, there is  
13 the burning grounds question. The burning  
14 ground went up to 1971. Now I don't know, you  
15 know, when all the 643-G operations took place  
16 with thorium. We could look at it, but we  
17 haven't. And felt that this is kind of -- we  
18 should point out to NIOSH that there are a  
19 number of operations that are not covered.  
20 And let NIOSH specify the list.

21 DR. TAULBEE: Well, I guess my

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1 concern here is is that you've made statements  
2 that there are many other areas. And I'm  
3 looking at the 200 area and the 700 area and  
4 potentially the G area. So I knew fully well  
5 of the 200 area, and we know that operation of  
6 what was going on.

7 The 700 is the one that has caught  
8 me a little bit off guard here. So to me  
9 you're making a lot of generalizations that  
10 there are all of the areas, you know, all of  
11 the -- each of the reactors, the G area and  
12 some others. And I'm --

13 DR. LIPSZTEIN: Okay. Maybe I  
14 didn't explain myself. What I wanted to say  
15 is that you can't extrapolate from the 300  
16 areas to the other areas without an analysis.

17 So we didn't put the 200 area although we  
18 need because the bounding intake could be from  
19 the 300. I didn't see that.

20 DR. TAULBEE: Okay. That's the  
21 point there.

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1 DR. MAKHIJANI: And also we didn't  
2 say the 100 area. Actually the 100 area was  
3 also involved from time to time. And in the  
4 prior report, we actually have an example of  
5 that.

6 And as I'm saying, there are  
7 several areas, many areas, you know, there is  
8 not one 700 area of work. We've given you two  
9 different examples.

10 In the prior lists, some of those  
11 operations may extend past '65. We haven't  
12 actually gone -- I'm just saying the same  
13 thing over again. I just -- if the Working  
14 Group directs us to come up with a more  
15 definitive list, we can do it. But I think  
16 this --

17 CHAIRMAN GRIFFON: No, I think  
18 that delves into the --

19 DR. MAKHIJANI: Yes, we've given  
20 NIOSH some illustrations. But there are  
21 several areas that -- yes, that NIOSH should

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1 define the source terms and the periods and  
2 exposure potentials.

3 CHAIRMAN GRIFFON: I think we're  
4 saying the same thing here. So go ahead,  
5 Joyce.

6 DR. LIPSZTEIN: And then the air  
7 sample results from the 300-M area were some  
8 back to '68, January and February '68 where  
9 the major campaigns were. But the results  
10 were extrapolated to '71.

11 And the document says that it  
12 would be based on contamination survey  
13 measurements from that time period. And we  
14 didn't see an extrapolation from these  
15 contamination surveys.

16 Actually I think it is a good  
17 thing because I think extrapolating from  
18 contamination survey results is too much  
19 uncertainties on the expected data on the  
20 document that you doing. And I didn't see it.

21 And I saw some log sheets from '71

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1 where there were radiation safety log sheets  
2 from the 300-M area in '71 that said that  
3 there were exposures to thorium. So I don't  
4 know how these would compare with the air  
5 samples taken until '68. But there was  
6 nothing about '71 documents.

7 So we would like to -- you know --

8 DR. CHMELYNSKI: We're missing  
9 much of what you're saying on the telephone.  
10 Could you move closer please?

11 DR. LIPSZTEIN: Okay. I'm sorry.

12 I'm saying that everything, it goes -- the  
13 air sampling results goes until '68, February  
14 '68 where there was the major campaigns for  
15 thorium. And the document, RPRT-46, mentions  
16 that after that time, that the bounding  
17 intakes would be covered through the  
18 contamination surveys. And actually this was  
19 not done. And I think actually it is a good  
20 thing that it was not done that way.

21 But anyway, we have references of

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1 some operations that took place in `71 where  
2 there were exposures to thorium disks, tubes,  
3 and billets. But the data from -- until `68  
4 were extrapolated to `71. And we would like  
5 to see some comparisons and to say oh, this is  
6 a good thing to do. We can do this because  
7 exposures at that time were higher or  
8 something like that. We didn't see any  
9 analysis of it.

10 And then another problem that we  
11 saw, you know, I don't know if I'm going into  
12 too much detail without sending this --

13 CHAIRMAN GRIFFON: Yes, just give  
14 highlights. I don't think you want to get too  
15 much in detail.

16 DR. LIPSZTEIN: Yes, yes, yes,  
17 just the thorium results that were done also  
18 for a limited period -- analyzed for a limited  
19 period of time, and we would like to see why  
20 it concerns and if there is any problems with  
21 interference from radon-222 from the uranium

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1 figures on those thorium measurements.

2 And if there was compatibility  
3 between the thorium-232 to weight that you  
4 could see at the end of the sampling and the  
5 thorium results, if it is possible to do this.

6 Okay.

7 DR. MAKHIJANI: This is about  
8 thoron.

9 DR. LIPSZTEIN: Thoron, yes,  
10 radon-220.

11 CHAIRMAN GRIFFON: And, again,  
12 that's just a heads up. So you'll get the  
13 written thing and then we can respond more.

14 DR. LIPSZTEIN: Yes.

15 DR. NETON: About how soon before  
16 we get that?

17 DR. MAKHIJANI: I hope to attend  
18 the review and finish it, you know, as soon as  
19 -- right after the Board meeting. So early  
20 March, Nancy will send it to the DOE. So you  
21 should see it by mid to end March.

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1                   I have a question about this,  
2 Mark. Now, you know, we've raised this  
3 question both in Matrix Item 1 and 2. Between  
4 them, there are certainly many examples of  
5 thorium processing, half a dozen or more in  
6 areas outside of the 300 that were covered by  
7 these two reports.

8                   And it's just a question, Tim.  
9 The process for completing that, I understand  
10 that that ball is in NIOSH's court. Is it an  
11 immediate task? Do we wait until -- because,  
12 you know, we could spend some more time coming  
13 up with more examples.

14                   And -- or maybe NIOSH is making --  
15 there are also examples of -- in the November  
16 report, I mentioned the status report. You  
17 know there was thorium scrap handling.

18                   There is -- in the report we just  
19 covered, there was a thorium source from Vitro  
20 that is not mentioned anywhere. We don't know  
21 what happened with that. There are also

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1 thorium inventories at Savannah River Site  
2 that go beyond 1971. And we don't know what  
3 the handling of those thorium inventories was.

4 And so there is a fair amount --  
5 there is a fair to-do list. And some of these  
6 things are -- beyond '71, are undoubtedly  
7 small because I think it was just inventories  
8 that nothing was happening with that. And in  
9 some places, it is indicated that maybe some  
10 handling was happening.

11 And we didn't get into the details  
12 of it. We've just seen the inventory list and  
13 how it changed.

14 DR. NETON: I think, Arjun, the  
15 burden is on us.

16 DR. MAKHIJANI: Right. Okay.  
17 Just wanted to make clear.

18 DR. NETON: We need go back and  
19 redouble our efforts to look at sources of  
20 thorium and explain how we're going to deal  
21 with that.

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1                   CHAIRMAN GRIFFON:     And I think  
2     much like the later action item on the  
3     exotics, I think it would be useful if you  
4     could lay out just a matrix, you know, showing  
5     area and time frame and, you know, nuclide --  
6     in this case, it's thorium but for the other  
7     exotics.     Because I think that was on an  
8     action for the other --

9                   DR. TAULBEE:     Not for us.

10                  CHAIRMAN GRIFFON:     Under exotics,  
11     we didn't ask for a full list of these 150  
12     that were mentioned?

13                  DR. TAULBEE:     That was on SC&A.

14                  DR. MAKHIJANI:     No, no.     When we  
15     come to the that item and I'll tell you what  
16     was in our charter and what we did.

17                  CHAIRMAN GRIFFON:     Let me just be  
18     clear.     I agree with Jim that, you know, it  
19     sounds like there's several little things that  
20     have been brought up and maybe they're small  
21     and you can just say, you know, the

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1 description and here is why they are bounded  
2 by the other approach or whatever. But we  
3 have to at least answer those questions.

4 All right. Anything else on that  
5 Item 4 -- or Item 3?

6 DR. MAKHIJANI: So is there a  
7 NIOSH task to come up with a thorium sort of  
8 complete assessing information?

9 DR. LIPSZTEIN: And if there is  
10 similar data -- construction workers and non-  
11 construction workers --

12 CHAIRMAN GRIFFON: You know, an  
13 overview of thorium operations, and time  
14 frames, and areas.

15 DR. MAKHIJANI: And the point that  
16 Joyce is bringing up is that if you are going  
17 to use the existing sort of intake rates from  
18 these two reports, that there be some analysis  
19 that you're going to apply it -- how you are  
20 going to apply it to these other areas or come  
21 up with --

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1 CHAIRMAN GRIFFON: Right.

2 DR. MAKHIJANI: -- come up with  
3 some other methods.

4 CHAIRMAN GRIFFON: Or if it is a  
5 defense, that the other area is bounding of  
6 this situation or whatever, yes. Okay.

7 That's an action item. Did you  
8 capture that one?

9 All right. Item 3 is the recycled  
10 uranium.

11 DR. MAKHIJANI: Yes, this report  
12 is in process. I could not find the  
13 underlying analytical documents and the basic  
14 reference. I sent Tim an email asking for two  
15 documents before Christmas, and Tim replied  
16 that he was having a hard time getting it.  
17 And I haven't heard --

18 MR. MAHATHY: I just got an email  
19 yesterday. I think that they have located  
20 those and are sending them to Tim.

21 DR. MAKHIJANI: Okay.

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1 CHAIRMAN GRIFFON: Okay.

2 DR. MAKHIJANI: So that would be  
3 helpful because I've started my own -- because  
4 Tim said you might want to look on your own.

5 DR. TAULBEE: Once we get them in  
6 the SRDB, I'll send you those numbers.

7 CHAIRMAN GRIFFON: You'll give the  
8 SRDB numbers --

9 DR. MAKHIJANI: Yes, and just let  
10 me know that they are there so I know to look.

11 And so that report is pending because I do  
12 want to look at those two documents before I -  
13 -

14 CHAIRMAN GRIFFON: Okay.

15 MR. KATZ: What sort of time  
16 frame?

17 DR. MAKHIJANI: Whenever I get the  
18 two documents, then I have to -- so February  
19 I'm out of pocket in February. So it will be  
20 March.

21 MR. KATZ: Okay. Just generally.

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1 DR. MAKHIJANI: But I've done most  
2 of the work, depending on what shows up in  
3 these documents.

4 CHAIRMAN GRIFFON: Mike, if you  
5 can put time frames on these actions, too,  
6 that's always good to have. So the last one  
7 was March, right, for your thorium report,  
8 thorium oxide report?

9 MR. MAHATHY: They did final  
10 documents. They're getting it reviewed, and  
11 as soon as it's cleared, they're going to send  
12 it.

13 MR. KATZ: Yes, they have --  
14 SC&A's documents are both March right now.

15 CHAIRMAN GRIFFON: Yes, they're  
16 both March, yes. And how about for the  
17 thorium operations? Can we get a time frame  
18 on that? As long as we're keeping these  
19 actions, I think that's a good idea. I meant  
20 to do that this morning.

21 DR. TAULBEE: I need to talk to

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1 the site to get access to get down there to  
2 look at their reports. I hesitate to give you  
3 a date.

4 MR. KATZ: You don't need to give  
5 us a date now for this. But you can get  
6 information and then give us a rough date as a  
7 starting point.

8 DR. TAULBEE: Okay.

9 CHAIRMAN GRIFFON: So that was  
10 Issue 3. There's nothing really more to say  
11 there, right, Arjun, on 3?

12 DR. MAKHIJANI: No.

13 CHAIRMAN GRIFFON: Item 4, fission  
14 fragments --

15 DR. MAKHIJANI: Item 4 is NIOSH's.

16 DR. TAULBEE: This falls into,  
17 again, the coworker models as well. This is  
18 what we were talking about -- well, basically  
19 the Monte Carlo permutation test is one of  
20 them that we proposed for this. Our sequence  
21 that we wanted to go through was tritium,

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1 uranium, plutonium, americium, curium,  
2 californium, which is what this particular one  
3 is, and look at construction trades workers  
4 versus what we would do for complete sample or  
5 a regular coworker model. Now -- so this is -  
6 -

7 CHAIRMAN GRIFFON: Are all the  
8 data sets up for these data? Do we have  
9 access to -- does SC&A have access to all the  
10 data? You said you have extensive data for  
11 all of these. I think you said that.

12 DR. TAULBEE: Yes. I'm not sure  
13 that they are in the final form right now.  
14 But I can check on that. And if they are in  
15 our final form, then I'm assuming that you  
16 would like for me to post these, correct?

17 CHAIRMAN GRIFFON: Yes.

18 DR. MAKHIJANI: It would be very  
19 useful to have because on these, the whole  
20 thing about dose versus bioassay doesn't come  
21 up because we're going to look at bioassay for

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1 these.

2 DR. TAULBEE: Yes. Right.

3 Absolutely on these.

4 DR. MAKHIJANI: So in a way --

5 CHAIRMAN GRIFFON: You can at

6 least get a sense of --

7 DR. MAKHIJANI: -- I think these  
8 items don't need to be pending for our  
9 finishing the tritium review because in my  
10 opinion, from what I have seen of these data,  
11 and admittedly, I haven't seen the larger  
12 database that you're preparing, but there were  
13 early data that we've looked at. And there's  
14 certainly periods for which the data look  
15 pretty sparse.

16 Now that may be you have a bigger  
17 database, and maybe that problem will go away,  
18 but it would be very useful to have these data  
19 as soon as possible. And I personally --

20 DR. TAULBEE: I think we can  
21 commit to get the uranium one up very quickly,

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1 correct? The plutonium and the --

2 MR. MAHATHY: Yes.

3 DR. TAULBEE: -- americium, curium  
4 one, that might take us a little longer.

5 MR. MAHATHY: Well, it might take  
6 a little longer. Technically it should all be  
7 near the final stage but --

8 DR. TAULBEE: Right.

9 MR. MAHATHY: -- we'll have to  
10 check --

11 DR. TAULBEE: I'm thinking there  
12 was some limited data issues that Arjun is  
13 talking about with the americium, curium,  
14 californium. But we do have all those log  
15 books --

16 MR. MAHATHY: Yes.

17 DR. TAULBEE: -- where if they,  
18 you know, we can expand beyond the claimant  
19 data set. And for those it wasn't going to  
20 take a huge amount of effort, I think, to get  
21 that additional data. So we will commit to

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1 sending the uranium really, really soon.

2 DR. MAKHIJANI: But my concern is  
3 about these others because when we looked at  
4 them first, and a year ago we said the same  
5 thing, that, you know, you can go to the log  
6 books and expand the database. And it's --  
7 no, this isn't a Work Group bailiwick. It's  
8 not in mine. But I think -- personally from  
9 our review point of view, it would be -- I'm  
10 producing these series of reports from -- and  
11 certainly I've had some questions as to how  
12 much time we're taking to do this work and the  
13 hours we're putting in.

14 And as the task manager, the  
15 number of hours we put in multiply greatly  
16 when we're producing a different report for  
17 every single thing. If we had -- if we had --  
18 these data are all going to be in one bin.

19 Do we have enough information for  
20 the various periods for construction workers  
21 and non-construction workers? And, you know,

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1 to some extent, you may not even have to get  
2 to whether you're parsing the data by areas  
3 and so on for some of these radionuclides.

4 It would be very helpful in terms  
5 of efficiency if we could have all of these  
6 data and not do it sequentially because  
7 sequentially it could take a very, very long  
8 time. We get the data. We produce one  
9 report. We review it.

10 Then, you know, we -- it's up to  
11 the Work Group how you want to proceed. But  
12 from the point of view of resources, I can  
13 tell you certainly it takes a lot more  
14 resources if you're doing a report on every  
15 radionuclide.

16 DR. TAULBEE: I agree  
17 wholeheartedly with you there, Arjun. The  
18 problem is is that even for tritium, which  
19 doesn't have any of these other issues, we  
20 can't agree yet.

21 DR. MAKHIJANI: I think we're

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1 going to have different issues for these other  
2 radionuclides. For tritium, we have lots of  
3 data.

4 CHAIRMAN GRIFFON: Yes, lots of  
5 data. There's no question there.

6 DR. MAKHIJANI: Here, it is going  
7 to be mainly do you have the data or not. Do  
8 you have bioassay data?

9 CHAIRMAN GRIFFON: Then it would  
10 be a matter of selecting the statistical  
11 method to assess the data. It may be that,  
12 you know, there's -- I mean I would like to  
13 see are we talking about 50 data points in 20  
14 years or are we talking about a lot. I don't  
15 know. I have no idea what the --

16 DR. MAKHIJANI: From what we saw -  
17 -

18 CHAIRMAN GRIFFON: -- quantity of  
19 the data is, you know?

20 DR. MAKHIJANI: -- from the  
21 claimant database that we saw before,

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1 certainly the question of whether there are  
2 sufficient data -- I'm not talking about the  
3 uraniums and the plutoniums or the tritiums.

4 Those are the three, I think, that  
5 are in a separate category where I think the  
6 quantity of data is probably much -- a much  
7 smaller issue. They were the main  
8 radionuclides. People were worried about  
9 them. They were being monitored.

10 But these other things, closer to  
11 the thorium bin, were they monitored  
12 adequately and frequently? And which groups  
13 of workers were monitored? So from my point  
14 of view, we're being asked to be more  
15 efficient. And I would like to be more  
16 efficient.

17 It would be useful to know whether  
18 we're getting into these longer, more  
19 difficult questions, you know, that we're  
20 talking about with tritium or whether it is  
21 simpler to settle it.

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1 DR. TAULBEE: If you would want us  
2 to focus more on the americium, californium,  
3 curium, certainly we can.

4 CHAIRMAN GRIFFON: Well, I mean  
5 I'm not saying to focus on them. I'm saying  
6 just post the data. I mean over two years  
7 into the SEC, I think we should be able to  
8 post the data, you know? We don't have a  
9 coworker model yet, which is a whole separate  
10 issue on this SEC process, but at least the  
11 data should be available to the Work Group and  
12 SC&A. So I would --

13 DR. MAKHIJANI: And then, you  
14 know, the next items are the same, neptunium,  
15 cobalt, polonium.

16 CHAIRMAN GRIFFON: Yes.

17 DR. MAKHIJANI: Exactly the same  
18 items.

19 CHAIRMAN GRIFFON: Because I think  
20 there is a different argument if you have a  
21 very scarce number of data points, you know,

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1 the question of whether your approach -- the  
2 methodology to tease apart the construction  
3 worker and non-construction worker may not  
4 even -- we may not even get to that point, you  
5 know. If it's -- I don't know if it's --  
6 usually that's our problem with some of these  
7 types of radionuclides is that we have very  
8 limited bioassays.

9 Yes, at least post the data. And  
10 then they're going to come back -- they are  
11 going to assess -- SC&A will assess that  
12 question of the methodology for separating  
13 that.

14 DR. MAKHIJANI: Oh, yes.

15 CHAIRMAN GRIFFON: Yes, out of the  
16 tritium report.

17 DR. MAKHIJANI: No question.

18 CHAIRMAN GRIFFON: In the mean  
19 time --

20 DR. MAKHIJANI: We will do that.

21 CHAIRMAN GRIFFON: -- yes, if we

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1 can get the data posted, that would be great.

2 All right. Is there anything else from Item  
3 4 at this point? Not really.

4 Five through seven, is that the  
5 same as Item 4?

6 DR. MAKHIJANI: That's right. And  
7 eight.

8 DR. TAULBEE: Eight is a little  
9 separate. I have an update for that.

10 CHAIRMAN GRIFFON: Okay. On five  
11 through seven, stop me if I've got the wrong  
12 area, but where does this question come up,  
13 Arjun, on the -- there was a mention of a vast  
14 number of other nuclides -- 150 --

15 DR. MAKHIJANI: Well, that's a  
16 separate item.

17 CHAIRMAN GRIFFON: That's a  
18 separate item?

19 DR. MAKHIJANI: Yes, down below  
20 under exotic.

21 CHAIRMAN GRIFFON: Okay, all

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1 right. I'll wait on that then.

2 DR. TAULBEE: Number 11, right?

3 CHAIRMAN GRIFFON: Okay. That's  
4 coming up. Okay.

5 DR. MAKHIJANI: Yes, actually --

6 CHAIRMAN GRIFFON: Oh, yes, I see.

7 DR. MAKHIJANI: -- we separated --  
8 before they were all mixed up.

9 CHAIRMAN GRIFFON: Yes, okay.

10 DR. MAKHIJANI: And then we  
11 separated them.

12 CHAIRMAN GRIFFON: Okay. Got it.  
13 All right. So Item 8 then?

14 DR. TAULBEE: Yes, we have a  
15 report on this polonium work. And we just  
16 received the ADC review yesterday, the final  
17 one. So as soon as I get the finalized one,  
18 I'll -- you guys will be getting it. So I  
19 would expect it within the week.

20 CHAIRMAN GRIFFON: A date on that?

21 DR. TAULBEE: The end of the week.

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1 CHAIRMAN GRIFFON: Item 9?

2 DR. MAKHIJANI: And did you want  
3 us to do anything with that?

4 CHAIRMAN GRIFFON: Well, yes, I  
5 think review it, right?

6 DR. MAKHIJANI: Okay.

7 CHAIRMAN GRIFFON: Yes.

8 DR. MAKHIJANI: I just want to  
9 make it an action item.

10 CHAIRMAN GRIFFON: Yes, you're  
11 right.

12 MR. KATZ: Let's say it.

13 CHAIRMAN GRIFFON: Yes, let's say  
14 it.

15 DR. MAKHIJANI: Thank you. Thank  
16 you.

17 CHAIRMAN GRIFFON: Number 10 -- we  
18 did Number 9, right?

19 DR. TAULBEE: No, Number 9, I have  
20 another update.

21 CHAIRMAN GRIFFON: Oh, you have

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1 another update? Okay.

2 DR. TAULBEE: That's the Part 2  
3 part of the report where we compared  
4 construction trades workers versus non-  
5 construction trades workers --

6 CHAIRMAN GRIFFON: Right.

7 DR. TAULBEE: -- instead of the  
8 complete sample. That report has cleared our  
9 internal review. And we're actually giving it  
10 to Jim for his final review. And then it will  
11 go out to ADC. So I would say by the end of  
12 the month that should be done.

13 CHAIRMAN GRIFFON: And SC&A should  
14 review parts 1 and 2, I would say.

15 DR. MAKHIJANI: Yes. If you don't  
16 mind, what I will do is I will kind of stop it  
17 until we get both reports and review both  
18 reports in one document.

19 CHAIRMAN GRIFFON: Yes, one and  
20 two. I understand. There's an action, you  
21 have to start on the first one first.

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1 MR. KATZ: You said within a month  
2 or so?

3 DR. TAULBEE: I would say by the  
4 end of the month you should have that. A  
5 little bit depends upon Jim's schedule.

6 MR. KATZ: Yes, of course.

7 CHAIRMAN GRIFFON: Item 10,  
8 tritide questions.

9 DR. TAULBEE: Yes, this is one  
10 where I'm not sure -- the initial path was for  
11 me to generate a summary of the interview  
12 notes that are down there. And we've started  
13 that.

14 I've run into a little bit of  
15 difficulty, and I'd actually like some  
16 assistance from Kathy DeMers. She was there  
17 as well, if that's okay if we could work  
18 together to finalize these. I've got some  
19 questions. Some of my writing I can't read,  
20 and I'm pretty sure she can read and help me.

21 CHAIRMAN GRIFFON: Well, I think

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1 it's for SC&A but I assume that would be  
2 probably be --

3 DR. MAKHIJANI: This is a kind of  
4 procedurally difficult thing. I mean I didn't  
5 know about this handwriting thing, helping  
6 with that.

7 DR. TAULBEE: It's my fault.

8 DR. MAKHIJANI: No, but we did the  
9 interviews together, and I haven't seen any of  
10 it yet, but I know that our -- we decided that  
11 we were going to compile our summary  
12 separately since we are supposed to give you  
13 independent reports. And that we weren't  
14 going to produce a common set of notes. And  
15 so -- I mean if --

16 DR. TAULBEE: I was under the  
17 impression we were producing a common set of  
18 notes. That was what we talked about when we  
19 were down there. But --

20 DR. MAKHIJANI: No. We've never  
21 done a common report --

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1                   CHAIRMAN GRIFFON:    I wasn't down  
2                   there so I don't know.

3                   DR. MAKHIJANI:    -- with NIOSH, it  
4                   has not been in our procedures.  We always  
5                   produce our own report.  I'm willing to take  
6                   direction from --

7                   CHAIRMAN GRIFFON:    I mean I can't  
8                   imagine there being a stark difference between  
9                   -- if you were interviewing together, right?

10                  DR. TAULBEE:    That's right.

11                  CHAIRMAN GRIFFON:    I would hope  
12                  you wrote similar things.

13                  DR. TAULBEE:    We would hope our  
14                  notes would be -- exactly.

15                  CHAIRMAN GRIFFON:    Yes, but I  
16                  don't --

17                  MR. KATZ:    Well, the action item  
18                  was for SC&A to present a memorandum.

19                  CHAIRMAN GRIFFON:    Right.

20                  DR. MAKHIJANI:    Right.

21                  CHAIRMAN GRIFFON:    It's underway.

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1 That's fine.

2 DR. MAKHIJANI: It is underway.

3 CHAIRMAN GRIFFON: My  
4 understanding on this is that Tim needs maybe  
5 some assistance in clarifying some of your own  
6 notes, right?

7 DR. TAULBEE: That's right.

8 DR. MAKHIJANI: I don't see an  
9 issue with that.

10 MR. KATZ: No, there's no problem  
11 with that. No problem with that.

12 CHAIRMAN GRIFFON: So I think  
13 that's fine.

14 MR. KATZ: Just get in touch with  
15 Kathy.

16 CHAIRMAN GRIFFON: -- issue the  
17 reports separately, that's fine.

18 DR. MAKHIJANI: Because our report  
19 is already at the DOE.

20 CHAIRMAN GRIFFON: Yes, right,  
21 right.

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1                   MR. KATZ:   And the interview notes  
2                   are raw data.  Everybody should have access to  
3                   that.  So absolutely --

4                   DR. TAULBEE:       Well,  if  your  
5                   interview notes are already at DOE -- okay, I  
6                   was going to say I could wait and maybe she's  
7                   already clarified.

8                   CHAIRMAN GRIFFON:  Yes.

9                   MR. KATZ:    But it if helps you to  
10                  get it directly from her in advance --

11                  DR. MAKHIJANI:    I don't see an  
12                  issue with that.

13                  CHAIRMAN GRIFFON:  No, I don't see  
14                  an issue.

15                  MR. KATZ:    Whatever you need.

16                  DR. TAULBEE:    Okay.

17                  DR. MAKHIJANI:    No, I didn't know  
18                  that that was the issue.

19                  CHAIRMAN GRIFFON:    That was the  
20                  issue, yes.  Okay.  That's not a problem.

21                  All right.  And, Arjun, you said

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1 your report on this -- on these interviews is  
2 being cleared. So it should be --

3 DR. MAKHIJANI: It is.

4 CHAIRMAN GRIFFON: -- available.

5 DR. MAKHIJANI: Yes, we'll share  
6 interview once it is -- yes, I believe that  
7 our -- I'll double check with Kathy, but I  
8 think our report is at DOE for review.  
9 Because there were some classification issues  
10 involved. And I think this particular thing  
11 may be taking time because of that although  
12 I'm speculating that.

13 MR. KATZ: Did I miss it? What's  
14 the timing for this?

15 DR. MAKHIJANI: It depends on when  
16 we get it back from the DOE.

17 CHAIRMAN GRIFFON: But it should  
18 be early March probably, right?

19 MR. KATZ: Just -- I mean --

20 DR. MAKHIJANI: No, the interview  
21 things have gotten very involved because we

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1 first have to get the -- our raw interview  
2 notes go to the DOE first. And when they come  
3 back, then they've got to go to all the  
4 interviewees. And we've got to get them back  
5 from the interviewees because we never  
6 finalize our interview notes until we've heard  
7 from the interviewees. And we exclude  
8 everything that was said by interviewees that  
9 did not respond.

10 I mean, we have that material in  
11 case the Board ever wants access to it. We  
12 don't publish it as an official interview  
13 summary that we use in our analysis.

14 CHAIRMAN GRIFFON: So then all  
15 that stuff has to get back. Then you do your  
16 --

17 DR. MAKHIJANI: Yes, so the  
18 process for -- especially for something that  
19 starts out classified is pretty involved.

20 CHAIRMAN GRIFFON: Right. Right.  
21 Right. So when any --

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1 DR. MAKHIJANI: I will call Kathy  
2 at the break and try to get --

3 MR. KATZ: You know you can do it  
4 after the meeting. You don't have to do --

5 CHAIRMAN GRIFFON: Yes, yes, we  
6 don't --

7 DR. MAKHIJANI: Okay. What I  
8 write down --

9 DR. TAULBEE: -- initial interview  
10 notes, handwritten, were cleared by DOE. And  
11 we've received them back. So we're at the  
12 stage of summarizing interviews. But then  
13 they have to go back to DOE to be reviewed.

14 DR. MAKHIJANI: Right.

15 DR. TAULBEE: Then they need to go  
16 to the people we've reviewed -- or  
17 interviewed.

18 MR. KATZ: Right.

19 CHAIRMAN GRIFFON: And refresh my  
20 memory -- all this interviewing is to  
21 determine what forms were used or what's the -

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1 - why are we doing this?

2 DR. TAULBEE: It was to determine  
3 the extent of the metal tritide operations at  
4 Savannah River. And so we interviewed a  
5 number of --

6 CHAIRMAN GRIFFON: Whether they  
7 were larger quantities or small?

8 DR. TAULBEE: Well, it wasn't so  
9 much -- I mean quantities because when they're  
10 used in the beds, you're looking at, you know,  
11 megacuries type of quantities.

12 CHAIRMAN GRIFFON: Right.

13 DR. TAULBEE: So it's huge.

14 CHAIRMAN GRIFFON: Well, I didn't  
15 know that all the forms were used in the beds.

16 DR. TAULBEE: They were not.

17 CHAIRMAN GRIFFON: Right.

18 DR. TAULBEE: They were not.

19 CHAIRMAN GRIFFON: Right.

20 DR. TAULBEE: There were several  
21 forms that were used.

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1                   CHAIRMAN GRIFFON:     That was my  
2 point.

3                   DR. TAULBEE:     And I guess just to  
4 give you a little bit of a summary of what we  
5 found --

6                   CHAIRMAN GRIFFON:     To the extent  
7 you can on the record here, okay?

8                   DR. TAULBEE:     That's true.     Yes,  
9 to the extent I can here, which is a  
10 significant fraction of it.

11                   CHAIRMAN GRIFFON:     Okay.

12                   DR. TAULBEE:     Most of the  
13 exposures are limited to the 200 area in the  
14 1980s forward where they began to use metal  
15 hydrides as part of their processing for  
16 purification for a whole slew of different  
17 reasons.

18                   A lot of the research that we were  
19 initially concerned with was conducted in the  
20 700 area.     Based upon the interviews, what we  
21 found is they used protium and deuterium in

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1 the 700 area because they weren't allowed to  
2 use in large quantities. You'd end up with  
3 too much tritium too close to the fence line.

4 So all of the -- they did a lot of  
5 research with protium and deuterium of a lot  
6 of exotic metals. So there is no radioactive  
7 concern there. But the ones that they did  
8 have problems, they moved out to the 200 area  
9 and worked with them out there. And that's  
10 what is the -- the primary -- the focus here.

11 So that's a summary of what we  
12 learned while we were down there. And Brad  
13 and Phil can elaborate on that if they want.

14 CHAIRMAN GRIFFON: And we'll get  
15 timing on the interview stuff from both of  
16 you.

17 DR. MAKHIJANI: Yes, I have that  
18 as an action item that I will get back to the  
19 Working Group about that.

20 CHAIRMAN GRIFFON: All right.

21 DR. MAKHIJANI: Could I ask a

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1 question about the tritides extent? At Mound,  
2 I know that the question of tritium in other -  
3 - you know, other than in the processing  
4 operations like in the boxes and hydrides and  
5 metals forming in the course of interaction  
6 with the gas, diffusion into the metals and so  
7 on came up. I don't know if that is being  
8 addressed.

9 DR. TAULBEE: It came up during  
10 the interviews, yes.

11 DR. MAKHIJANI: Right. Okay. So  
12 it will be addressed?

13 DR. TAULBEE: Yes, it is  
14 addressed.

15 DR. MAKHIJANI: Because I have not  
16 discussed the substance of the interviews with  
17 Kathy yet.

18 CHAIRMAN GRIFFON: Okay. I think  
19 that's probably as far as we've got.

20 DR. MAKHIJANI: Okay.

21 MEMBER SCHOFIELD: Arjun, this is

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1 Phillip. I've got a question on those  
2 tritides. Have either you or NIOSH developed  
3 kind of a generic method of handling these?

4 DR. MAKHIJANI: Handling?

5 MEMBER SCHOFIELD: Yes, the  
6 tritides. How we're going to do the -- what  
7 bioassays would be valid for these?

8 CHAIRMAN GRIFFON: I think he's  
9 asking the question of have you selected the -  
10 -

11 DR. MAKHIJANI: The dose  
12 reconstruction method?

13 CHAIRMAN GRIFFON: Yes, the  
14 approach to be used. And that's why you did  
15 these interviews, right?

16 DR. TAULBEE: That's right.

17 CHAIRMAN GRIFFON: No, I don't  
18 think they've got that yet. That's pending on  
19 the interview, you know, the outcome of what  
20 they found in the interviews on what forms  
21 were used, et cetera.

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1 DR. NETON: We have a generic  
2 approach in TIB -- outlines to reconstruct  
3 different solubilities of tritium compounds.

4 DR. MAKHIJANI: Right.

5 DR. NETON: But the trick is, as  
6 everyone is aware, is to figure out who used  
7 what and where and how much.

8 DR. MAKHIJANI: Right. Is there  
9 something contingent on these lab studies that  
10 you were doing at Lovelace?

11 DR. TAULBEE: One of the things  
12 that came out from our interviews is that in  
13 Savannah River, lanthanum nickel hydride, not  
14 tritide, is one of the metals used in the  
15 processing beds. That particular material,  
16 the solubility is currently unknown. The  
17 potential issue with this one is that Savannah  
18 River had started -- they've actually got a  
19 project to analyze the solubility.

20 DR. MAKHIJANI: Right.

21 DR. TAULBEE: The hold up that we

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1 talked to them in September with getting those  
2 samples sent out -- they were supposed to have  
3 gone out in June, they did not go out then --  
4 was that they had to basically update their  
5 SAR because this was an unresolved safety  
6 question to go in and actually take the  
7 samples.

8           These beds have only been changed  
9 out once since 1986. And so the process part  
10 of that that will be discussed in the  
11 interview notes is you cap them as soon as you  
12 break the line. And you take it out.

13           So this is going back into one  
14 which has never been done. So actually to  
15 determine the solubility is creating an  
16 unresolved safety question for something that  
17 effectively is, you know, to get enough of the  
18 sample to try it.

19           CHAIRMAN GRIFFON: So it is still  
20 on -- they don't know if they're going to do  
21 it.

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1 DR. TAULBEE: I have not talked to

2 --

3 CHAIRMAN GRIFFON: Okay.

4 DR. TAULBEE: -- them recently to  
5 find out where they're at. I believe they're  
6 still going to do it because they will want to  
7 know for future --

8 CHAIRMAN GRIFFON: Yes.

9 DR. TAULBEE: -- purposes. But  
10 right now, we're at such the early phase here  
11 --

12 CHAIRMAN GRIFFON: Yes.

13 DR. TAULBEE: -- that to get the  
14 solubility, you're actually creating the  
15 exposure scenario or creating --

16 CHAIRMAN GRIFFON: And the  
17 timeline for their work could be out a ways.

18 DR. TAULBEE: It could be, yes.

19 CHAIRMAN GRIFFON: Yes. So --

20 MS. BRACKETT: This is Liz  
21 Brackett. Tom had talked to somebody at

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1 Savannah River he told me earlier. And I got  
2 the impression that this is already underway  
3 and they're expecting results in the next few  
4 months.

5 DR. TAULBEE: Okay. So they did  
6 get the samples. They haven't sent them out.  
7 Okay.

8 MS. BRACKETT: You probably want  
9 to verify that. But that was what I thought  
10 he said.

11 CHAIRMAN GRIFFON: All right.  
12 Let's have NIOSH -- make that an action that  
13 NIOSH will follow up on that.

14 DR. TAULBEE: As of the end of  
15 August, those samples had not been collected  
16 yet.

17 CHAIRMAN GRIFFON: All right.  
18 Item 11 --

19 DR. LIPSZTEIN: It's in --

20 DR. TAULBEE: No, I'm sorry. In  
21 vitro.

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1 DR. LIPSZTEIN: In vitro.

2 DR. TAULBEE: Yes.

3 DR. NETON: This -- they did one  
4 compound previously --

5 DR. TAULBEE: They did several.

6 DR. NETON: They did several?

7 DR. TAULBEE: Yes.

8 DR. NETON: This should complete  
9 the picture on the others.

10 DR. TAULBEE: It helps. It's one  
11 of the more common ones that they've used.

12 CHAIRMAN GRIFFON: Okay. Item 11.

13 DR. MAKHIJANI: Yes, this was our  
14 action item from some time. And there was  
15 some confusion because there were overlapping  
16 lists of radionuclides. And we had compiled a  
17 partial list. And we were asked to publish  
18 that partial list.

19 And then there was a kind of  
20 redirection because the partial lists  
21 overlapped with some of the radionuclides

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1 we've already covered. And so -- and to try  
2 to sort that out.

3 So this is not a definitive list,  
4 and it was not my understanding that we were  
5 asked to come up with a definitive list, much  
6 less source terms, but we did send out a  
7 report on exotics with a list that is non-  
8 overlapping on --

9 MR. MAHATHY: December 10th.

10 DR. MAKHIJANI: December 10th.

11 DR. TAULBEE: Mid-December.

12 DR. MAKHIJANI: Mid-December. So  
13 that report has gone out, and I believe that  
14 our task on that is complete. And we await  
15 whatever the Working Group wants to do or  
16 whether NIOSH is going to respond.

17 We did not try to kind of track  
18 down every one of the radionuclides much less  
19 track down source terms and so on. And I  
20 think there are probably two or three dozen  
21 radionuclides in what we sent. Right, Mike?

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1 MR. MAHATHY: Yes.

2 DR. MAKHIJANI: So we're nowhere  
3 close to 150.

4 CHAIRMAN GRIFFON: And I'm trying  
5 to remember and I was talking to Arjun  
6 earlier, too, you know, I don't know where  
7 that 150 figure came from. Was it in the  
8 initial report? The summary report or  
9 something like that?

10 DR. TAULBEE: I think it was in  
11 the TBD, wasn't it?

12 DR. MAKHIJANI: It is in your 4E  
13 version of the TBD. But, you know, there  
14 aren't anywhere close to that number of  
15 radionuclides.

16 CHAIRMAN GRIFFON: Well, I mean  
17 this goes back to something Jim mentioned  
18 earlier, that it really is NIOSH's job to  
19 define the source terms so you have that in  
20 the TBD. And this is the list that SC&A came  
21 up with, but it's not their role to complete

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1 the picture, you know? So the question is,  
2 you know, are these experimental quantities?  
3 Are they lab quantities? You know, I think we  
4 need to get a sense of the source term  
5 picture.

6 DR. TAULBEE: My question to you  
7 is that I mean we can go through and we can  
8 try and determine, you know, for each of these  
9 what the source term was. My question,  
10 though, is which of these that Arjun listed  
11 there do you feel that there is a concern from  
12 a bioassay standpoint?

13 We have gross alpha urinalysis,  
14 that's the americium, curium, californium  
15 analysis. It's actually gross alpha. We have  
16 gross beta urinalysis.

17 CHAIRMAN GRIFFON: Well, I think  
18 that's up to you to answer how -- what model  
19 you would use to bound. I mean that's not --

20 DR. TAULBEE: So I guess what  
21 you're asking us to do is look at --

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1                   CHAIRMAN GRIFFON:    Look at this  
2 list and tell us your techniques --

3                   DR. TAULBEE:    Look at the list and  
4 tell us our technique for each one?

5                   CHAIRMAN GRIFFON:    And if they're,  
6 you know, so trivial that they don't --  
7 they're not applicable --

8                   DR. TAULBEE:    Then there wouldn't  
9 be any.

10                  CHAIRMAN GRIFFON:    -- then you  
11 don't include them. Right. I'm not saying  
12 you need a model -- a different model for  
13 every one. You may just -- they may all fit  
14 into one or two different versions. I don't  
15 know.

16                  DR. TAULBEE:    Okay. I understand  
17 what it is you're asking us.

18                  DR. MAKHIJANI:    Yes, I mean in our  
19 review -- what we have, yes, sure. What we  
20 have been looking for, as with the thorium, is  
21 is the data you are planning to use applicable

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1 to the place where the work was done. I mean  
2 it's true that, you know, a lot of these are  
3 beta emitters or alpha emitters. And so  
4 you've got samarium-151 or cadmium-113m.

5 But if it was being handled in a  
6 completely different area, and it's sort of  
7 like a fission product and you've got fission  
8 product data, I mean we'd be looking to see  
9 whether the fission product data was measured  
10 in a place and time that was applicable to the  
11 workers that were handling the radionuclide in  
12 question.

13 So I think -- and, you know,  
14 following some of the general criteria you put  
15 up, Jim, at the last Board meeting, right, is  
16 that fair?

17 DR. NETON: That's a fair comment.

18 DR. MAKHIJANI: Yes.

19 DR. NETON: You know, it's not --  
20 we need to not only establish, you know, that  
21 we have a technique that can balance those,

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1 but then we need to determine to which class  
2 of workers it applies to. Otherwise you run  
3 into the situation where we'll do all the  
4 analyses and pick the highest dose -- for the  
5 nuclide that gets the highest dose. And at  
6 some point, that doesn't really become  
7 credible in my view. So we need to go back.

8 CHAIRMAN GRIFFON: Or plausible.

9 DR. MAKHIJANI: Yes, and just as a  
10 caveat again, I said this but we didn't try to  
11 come up with a complete list. So I don't --  
12 you know, I don't know if there were 150 or --

13 CHAIRMAN GRIFFON: I think there's  
14 two actions for NIOSH to look at the SC&A  
15 report on the exotics --

16 DR. MAKHIJANI: Yes, right.

17 CHAIRMAN GRIFFON: -- and, you  
18 know, consider what approaches can be used for  
19 dose reconstruction for those nuclides that we  
20 just talked about. And the second is clarify  
21 this disparity between the TBD number and --

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1 you might have to go back to the source  
2 document or wherever that came from -- in this  
3 thing, we had a whole lot of nuclides here,  
4 you know.

5 DR. TAULBEE: That's my guess.

6 CHAIRMAN GRIFFON: Yes, yes. I  
7 mean it's been out there for a while. We've  
8 got to answer the question.

9 DR. NETON: Yes, it's just about --  
10 like the issue at Mound.

11 CHAIRMAN GRIFFON: Yes.

12 DR. TAULBEE: -- 238, 239, 240,  
13 it's all different. It adds up quickly.

14 CHAIRMAN GRIFFON: It quickly adds  
15 up, right.

16 DR. TAULBEE: Especially with  
17 fission products.

18 CHAIRMAN GRIFFON: Yes, okay.  
19 Anything else on that one, Arjun?

20 DR. MAKHIJANI: No, there is  
21 nothing.

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1 CHAIRMAN GRIFFON: On to Number 12  
2 then.

3 DR. MAKHIJANI: Number 12, I  
4 believe we said there was more on that, too.  
5 About a month ago -- I can't remember now when  
6 I said that --

7 DR. TAULBEE: The end of January  
8 or was it December --

9 DR. MAKHIJANI: It was about a  
10 month ago.

11 DR. TAULBEE: Anyway, we do have  
12 it.

13 DR. MAKHIJANI: You do have it.

14 DR. TAULBEE: I do have a question  
15 for you.

16 DR. MAKHIJANI: Yes?

17 DR. TAULBEE: And my question is  
18 can we get the names of the people that you  
19 interviewed that talked about these incidents?

20 DR. MAKHIJANI: Let me -- yes.

21 DR. TAULBEE: So we can do some

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1 further research.

2 DR. MAKHIJANI: Yes, as you know,  
3 we kind of take out the names when we send out  
4 the report. But I will write that in my  
5 action.

6 CHAIRMAN GRIFFON: But you can  
7 provide them internally, yes. Right. I mean  
8 yes.

9 DR. MAKHIJANI: We can certainly  
10 provide them internally.

11 DR. TAULBEE: If you could provide  
12 those, then we can do follow up and respond to  
13 them.

14 DR. MAKHIJANI: Provide NIOSH with  
15 the names.

16 CHAIRMAN GRIFFON: And NIOSH will  
17 follow up and respond to the report. Okay.

18 DR. MAKHIJANI: I can tell you,  
19 some of this stuff overlaps with the last item  
20 -- additional item we're going to cover -- the  
21 Bob Warren papers.

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1 CHAIRMAN GRIFFON: Right.

2 DR. MAKHIJANI: And the people  
3 that -- the petitioners and people that he  
4 interviewed and some of the workers who  
5 provided you with information during the May  
6 8th -- May 2008 meeting.

7 But we can certainly provide you  
8 with the names of people we interviewed, which  
9 was, I think, two years ago.

10 CHAIRMAN GRIFFON: Right.

11 Whenever you're ready, it's Number  
12 13. Oh, this is the TIB --

13 DR. MAKHIJANI: So NIOSH is  
14 responding to our report.

15 CHAIRMAN GRIFFON: Yes, yes.

16 DR. MAKHIJANI: Thirteen --

17 CHAIRMAN GRIFFON: TIB-52.

18 DR. MAKHIJANI: TIB-52, I think  
19 that item was complete from a long time back.

20 We -- oh, NIOSH -- this is a NIOSH.

21 MR. KATZ: It's a NIOSH --

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1 reporting on the status of the OTIB revision.

2 DR. TAULBEE: I know that there is  
3 a revision out there because it is on my desk  
4 to review. And I'm overdue for it. But I  
5 would expect that that would probably -- the  
6 revision would be coming out probably by the  
7 end of the month, although I can't guarantee  
8 with the Board meeting coming up.

9 CHAIRMAN GRIFFON: Okay. And I  
10 know this is on the Procedures list, too, but  
11 we said we were going to look at the Savannah  
12 River parking area.

13 DR. MAKHIJANI: Right. That's  
14 what we've been doing.

15 MR. KATZ: Right, exactly. So,  
16 okay, so we're looking at sometime in March.  
17 That gives you more than a month.

18 CHAIRMAN GRIFFON: Yes, March is  
19 becoming a popular month.

20 MR. KATZ: If it's not that, I was  
21 just interpreting what you just said. That's

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1 all. You said about a month.

2 DR. TAULBEE: Right. Well, I'm  
3 thinking these are two different things  
4 actually. There is a revision to the OTIB  
5 that has been done and was working its way  
6 through our review. And then there was the  
7 recent Procedures Work Group meeting where  
8 there was the Savannah River park -- got added  
9 there.

10 CHAIRMAN GRIFFON: Right.

11 DR. TAULBEE: And that got thrown  
12 over to me as well. But that's not covered in  
13 this revision that I was originally looking  
14 at. So I'm thinking there is going to be  
15 another revision that would address this.

16 CHAIRMAN GRIFFON: Okay. So it  
17 may delay it.

18 DR. TAULBEE: It may delay it.

19 CHAIRMAN GRIFFON: Yes, we don't  
20 have a time frame, but you're going to review  
21 it.

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1 DR. TAULBEE: Yes.

2 CHAIRMAN GRIFFON: That's the  
3 action. So, okay.

4 DR. TAULBEE: Because it seems  
5 like the week before I went on vacation, Brant  
6 forwarded me over something. And I'm like  
7 well, this isn't part of -- this wasn't  
8 covered in the most recent revision I was  
9 reading.

10 MR. KATZ: You can just update us  
11 on -- once you get a handle on that.

12 DR. MAKHIJANI: And we wait for  
13 further instructions when it comes out?

14 CHAIRMAN GRIFFON: When this  
15 action list is sent out to everyone, SC&A and  
16 NIOSH can try to put dates on those, you know,  
17 when you circulate it. We don't have them  
18 today, but we can try and put them in. Yes.

19 MR. KATZ: But as I say, you will  
20 review it when it comes out.

21 DR. MAKHIJANI: I have that down.

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1           Whenever it will come out.

2                           CHAIRMAN GRIFFON:           Yes.       All  
3           right.   Number 14.

4                           DR. TAULBEE:    This is another one  
5           where the draft report has been done and  
6           internal comment resolution is underway.

7                           CHAIRMAN GRIFFON:   Can you give us  
8           any highlights on it?

9                           DR. TAULBEE:    A little bit.   Mike  
10          can probably correct me here where we're  
11          wrong, but we did find some air sampling data  
12          from the burning grounds.   The operations were  
13          primarily for the solvents is what they were  
14          burning.   And we do have downwind air sampling  
15          data for it.   And Mike has analyzed that, and  
16          it is discussed there in the report when we  
17          get that out to you.

18                          There is some questions for the  
19          internal comment resolution that -- or some  
20          issues that have been identified.   And so Mike  
21          will be addressing those from our internal

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1 comments.

2 CHAIRMAN GRIFFON: Okay. And  
3 action will be SC&A will review this when it  
4 is available.

5 Items 15 through 16 -- 15 and 16 -  
6 - what's the issue? Is this related to the  
7 tritium?

8 DR. TAULBEE: It's kind of related  
9 to it with construction trades workers as to  
10 if they are different --

11 CHAIRMAN GRIFFON: Yes.

12 DR. TAULBEE: -- would we be  
13 applying adjustment factors.

14 CHAIRMAN GRIFFON: Right, okay.

15 DR. TAULBEE: Kind of all the  
16 coworker model issues.

17 CHAIRMAN GRIFFON: So there's  
18 nothing to really update. It's all rolled  
19 into that same issue, right?

20 DR. MAKHIJANI: I agree.

21 CHAIRMAN GRIFFON: Okay.

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1 DR. MAKHIJANI: Yes, I think both  
2 the things that were of concern to us in terms  
3 of the data and the model review now have been  
4 addressed already.

5 CHAIRMAN GRIFFON: Okay.

6 DR. MAKHIJANI: I mean have been  
7 addressed in the sense that we have action  
8 items.

9 CHAIRMAN GRIFFON: We've got  
10 action items on it, yes, okay. All right.

11 Item 17, neutrons, I know you had  
12 something on that earlier you were talking  
13 about.

14 DR. TAULBEE: I don't from this  
15 time period up to 1961.

16 CHAIRMAN GRIFFON: Oh, not from  
17 this period? Okay.

18 DR. TAULBEE: It's the issue at  
19 Number 18 actually. The '62 to '71, we --

20 CHAIRMAN GRIFFON: Well, first  
21 what's the update on 17?

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1 DR. TAULBEE: On 17? I don't have  
2 an update. I mean there's -- we just haven't  
3 done any progress on it.

4 CHAIRMAN GRIFFON: It's your  
5 action, but there's no progress.

6 DR. TAULBEE: It's my action.  
7 Absolutely.

8 CHAIRMAN GRIFFON: All right. Try  
9 to put a date in that updated list when it  
10 goes out, right? So it is a carryover action.  
11 But try to --

12 DR. TAULBEE: Try to put a date  
13 in.

14 CHAIRMAN GRIFFON: Eighteen?  
15 March -- we put March on all of them.

16 (Laughter.)

17 CHAIRMAN GRIFFON: I'll help you  
18 with the dates if you want me --

19 DR. TAULBEE: You want March? Oh,  
20 okay. I can almost guarantee 17 is not going  
21 to be by March, let me tell you. Just the

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1 volume of what work I need to do on that.

2           Eighteen is a possibility from  
3 that standpoint. With 18, as I think we  
4 mentioned before, we have paired measurements  
5 of when people wore NTA film and TLNDs. And  
6 so from that we've developed some NTA  
7 correction factors.

8           Our proposed analysis methodology,  
9 comparing the two to see if they are different  
10 is actually using the Monte Carlo permutation  
11 test, comparing the geometric mean and  
12 geometric standard deviation because those are  
13 the parameters that we assigned to these  
14 correction factors when we propagate them off  
15 into NP ratios for the different areas.

16           A little bit of a heads up,  
17 feedback, the different areas that we've  
18 looked at, most of the NTA correction factors,  
19 the geometric mean of that correction factor  
20 is around one or less than one except for two  
21 areas. And the two areas are the 300 area and

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1 the 777-M, which was some test reactors there  
2 in the 300 area as well.

3 Both of those appear to have more  
4 of a thermalized neutron energy spectrum, and  
5 so the correction factor would be greater than  
6 one. And so we'll be increasing those NTA  
7 doses before we apply the NP ratio.

8 But most of the other areas, the  
9 calibration methodology by them effectively  
10 over-moderating the source, resulted in a  
11 neutron energy calibration spectrum that was  
12 lower energy than what was observed in the  
13 other workplaces. So it is a little bit of  
14 foreground of what will be coming when we get  
15 that one done.

16 CHAIRMAN GRIFFON: Okay.

17 DR. TAULBEE: And I expect that  
18 one -- that one should be end of March. But  
19 then again, I said that it would be done in  
20 January this past time, didn't I? Yes.

21 CHAIRMAN GRIFFON: And, again, the

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1 reason you brought that up earlier was that  
2 you're going to use the same statistical  
3 methodology for this.

4 DR. TAULBEE: That's correct.

5 CHAIRMAN GRIFFON: So that's sort  
6 of --

7 DR. TAULBEE: Yes.

8 DR. MAKHIJANI: I mean right off -  
9 -

10 CHAIRMAN GRIFFON: The comment was  
11 on the methodology, right?

12 DR. MAKHIJANI: Yes, I'll be  
13 huddling with Harry a little bit on that.

14 CHAIRMAN GRIFFON: Yes, yes.

15 DR. TAULBEE: But it's just  
16 because I was to prepare these two somewhat  
17 for action -- they're log-normal distributions  
18 and how to compare whether they are similar or  
19 not, whether this works. So that was why.

20 MR. KATZ: So SC&A will review  
21 that.

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1                   CHAIRMAN GRIFFON: Yes. And March  
2 is the date on that? Just teasing you. All  
3 right.

4                   DR. TAULBEE: Well, two months ago  
5 I said January, I think.

6                   CHAIRMAN GRIFFON: Item 20.

7                   DR. TAULBEE: Sorry.

8                   DR. MAKHIJANI: That is closed.

9                   DR. TAULBEE: No.

10                  MR. KATZ: Not 20.

11                  DR. TAULBEE: Not 20. We have the  
12 draft --

13                  DR. MAKHIJANI: Oh, 19 is closed.

14                  CHAIRMAN GRIFFON: Oh, 19 is gone.

15                  DR. TAULBEE: Thank you, Ted.

16                  MR. MAHATHY: We can close it if  
17 you want to.

18                  DR. TAULBEE: No, no, no. Issue  
19 20, we have a draft in review. It's on my  
20 desk to review right now.

21                  MR. KATZ: So that's close?

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1 DR. TAULBEE: Yes. As you can  
2 see, I have a lot of work to do. A lot of  
3 things are on my plate.

4 CHAIRMAN GRIFFON: Wait. So there  
5 was --

6 MR. KATZ: There were two things  
7 for this. SC&A was supposed to -- documents  
8 on this geometry --

9 CHAIRMAN GRIFFON: Yes, that is  
10 what I was --

11 DR. MAKHIJANI: Did I forget?

12 CHAIRMAN GRIFFON: Yes, there is  
13 an action for SC&A.

14 DR. MAKHIJANI: Let me see.

15 CHAIRMAN GRIFFON: Documents about  
16 burning ground external dose geometry.

17 DR. TAULBEE: Right.

18 DR. MAKHIJANI: You know it  
19 totally slipped my mind. I'm very sorry. I  
20 will do it.

21 CHAIRMAN GRIFFON: Okay. So SC&A

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1 has that -- by March -- okay.

2 DR. MAKHIJANI: SC&A -- I'll send  
3 you an email. It's my turn to send you an  
4 email.

5 CHAIRMAN GRIFFON: It's getting  
6 late -- it's actually not that late.

7 So now we're up to -- is 21 closed  
8 I assume? Site Profile issue.

9 DR. TAULBEE: Yes.

10 CHAIRMAN GRIFFON: 22 and three --

11 DR. MAKHIJANI: We sent a report  
12 on 22 and three --

13 DR. TAULBEE: On January 20th.  
14 Yes, I have not --

15 DR. MAKHIJANI: It was a busy day,  
16 January 20th.

17 (Laughter.)

18 MR. MAHATHY: I haven't even  
19 looked at it.

20 CHAIRMAN GRIFFON: So we will  
21 respond to it, Arjun --

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1 DR. MAKHIJANI: You know, I've  
2 been sending out so many reports, at least me  
3 --

4 CHAIRMAN GRIFFON: It says the  
5 external dose issues raised by the  
6 petitioners.

7 DR. MAKHIJANI: Yes, that's right.

8 CHAIRMAN GRIFFON: So I think we  
9 want to maybe --

10 DR. MAKHIJANI: Let me open the  
11 report.

12 CHAIRMAN GRIFFON: Okay.

13 DR. MAKHIJANI: And when I look at  
14 it, can you give me just a minute to look at  
15 it?

16 CHAIRMAN GRIFFON: Yes, yes, take  
17 your time.

18 DR. TAULBEE: Let's take a five --

19 CHAIRMAN GRIFFON: Yes, let's --  
20 let's take ten minutes. And then when we come  
21 back, we'll do Items 22 and 23.

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1 DR. MAKHIJANI: Yes, thank you  
2 very much. I appreciate that.

3 CHAIRMAN GRIFFON: All right. So  
4 we're just going to put the phone on mute,  
5 right, Ted?

6 MR. KATZ: Yes.

7 (Whereupon, the above-entitled  
8 matter went off the record at 2:04 p.m. and  
9 went back on the record at 2:11 p.m.)

10 MR. KATZ: Okay. We're back  
11 again. Let me just check and see if we have  
12 Brad and Phil.

13 MEMBER CLAWSON: Yes, I'm here.  
14 This is Brad.

15 MR. KATZ: You sound very  
16 enthusiastic, Brad.

17 MEMBER CLAWSON: Oh, no problem.

18 (Laughter.)

19 MR. KATZ: Okay. All right.

20 MEMBER SCHOFIELD: Okay, Ted, I'm  
21 back on.

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1 MR. KATZ: Great. Thanks, Phil.

2 CHAIRMAN GRIFFON: Thanks. We  
3 just want to -- I think this is our last item.  
4 But I just wanted to give Arjun a chance to  
5 review his report. So we're ready to  
6 summarize this.

7 Arjun?

8 DR. MAKHIJANI: Yes. So this was  
9 external dose issues raised by petitioners.  
10 So, you know, we just cataloged them. And in  
11 one or two cases, we made some judgment about  
12 them because we had done prior work in our  
13 paper review and prior instructions from the  
14 Work Group. And so there was some accumulated  
15 work there that related to these two items.  
16 And to the extent there was, we thought we'd  
17 give it to the Work Group.

18 Now the caveat on this whole  
19 report is we're not reopening the question of  
20 whether the HPAREH database adequately  
21 reflects the, you know, dose records and

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1       whether it's, you know, whether the  
2       deficiencies in the database and the other  
3       database are such to prevent coworker models  
4       and so on. We considered that issue to be  
5       settled.

6                       So the issue, you know, we've  
7       discussed it and it was settled it on the  
8       context of TIB-52. And there is an adjustment  
9       for pipefitters. And so we did not reopen  
10      that issue. Although petitioners have raised  
11      that issue, we didn't reopen it here.

12                      Just to say that from our point of  
13      view, even though petitioners have raised that  
14      issue, it has been discussed and we did not  
15      re-discuss it. All that literature is  
16      available.

17                      The thing --

18                      CHAIRMAN GRIFFON:     Discussed or  
19      settled?

20                      DR. MAKHIJANI:     Settled -- both.

21                      CHAIRMAN GRIFFON:     Okay.

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1 DR. MAKHIJANI: But the thing with  
2 respect to HPAREH that is relevant here in the  
3 context of the issues raised by the  
4 petitioners is not the database itself. It is  
5 the question of the thing connecting all of  
6 these items. Is the recorded dose, whether it  
7 is in the worker's data sheet or in the  
8 electronic databases, does the recorded dose  
9 reflect the worker's work experience.

10 So the dose the worker got, is it  
11 reflected in the badge readings and so on? So  
12 -- and that's the thread that connects the  
13 items that are listed here, raised in the  
14 petitions and in the interviews, and to some  
15 extent, some of these were also items that  
16 came up with Bob Warren's materials. So we  
17 went through the petition and the petitioners'  
18 affidavits and all of that.

19 So the first -- this whole group  
20 of concerns that workers said that we worked  
21 in areas thought to be clean. We weren't

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1 wearing badges. And then the equipment turned  
2 out to be contaminated or the area turned out  
3 to be contaminated.

4 Now NIOSH addressed this in part  
5 in its Evaluation Report in saying that there  
6 were perhaps workers who worked without --  
7 construction workers who worked without badges  
8 sometimes. And radiological material and  
9 equipment was removed and the areas were taped  
10 off. And there was monitoring at the  
11 perimeters. And so there is information to  
12 assign the dose.

13 And the main -- but it doesn't  
14 appear to us that that addresses the concerns  
15 that are related by the petitioners. Because  
16 the petitioners are citing examples where they  
17 did not -- no one knew that the material was  
18 contaminated, that the equipment was  
19 contaminated, or the area was contaminated.  
20 And they weren't wearing badges.

21 So that's the kind of situation

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1 for which we haven't seen -- that's the  
2 situation we haven't seen addressed.

3 CHAIRMAN GRIFFON: But no one knew  
4 until after the fact, is that right?

5 DR. MAKHIJANI: Until after the  
6 fact. And so what the petitioners are saying  
7 is we weren't wearing badges because we were  
8 in areas thought to be clean. And there was  
9 no monitoring basically. There was none of  
10 the perimeter monitoring that NIOSH talked  
11 about in the Evaluation Report. And we  
12 haven't seen NIOSH address that particular  
13 issue.

14 The second was --

15 CHAIRMAN GRIFFON: Again, this is  
16 just a head up?

17 DR. MAKHIJANI: Yes.

18 CHAIRMAN GRIFFON: You've got your  
19 report.

20 DR. MAKHIJANI: Yes, we've got the  
21 report. You have it. And you haven't had a

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1 chance --

2 CHAIRMAN GRIFFON: Well, the  
3 action is going to be NIOSH will review the --

4 DR. MAKHIJANI: I'm just giving  
5 you a rundown --

6 CHAIRMAN GRIFFON: Just a head up,  
7 right.

8 DR. MAKHIJANI: -- summary.

9 And so then there's a familiar  
10 issue, you know, of people wearing temporary  
11 badges that didn't have their name or wearing  
12 badges in a way that would shield the dose to  
13 not exceed the dose limits or working on  
14 weekends other than day shifts when they  
15 didn't have badges to wear or didn't wear  
16 badges.

17 So this issue has come up before.

18 But it hasn't been explicitly addressed in  
19 the context of the Evaluation Report.

20 MEMBER CLAWSON: Arjun?

21 DR. MAKHIJANI: Yes?

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1                   MEMBER CLAWSON:     This is Brad.  
2                   One of the ones that came up that was  
3                   interesting to me in these interviews was that  
4                   when you were a construction worker, you just  
5                   weren't assigned to one area. And so you may  
6                   work one day in this area and then that night,  
7                   if you happened to work overtime, you were in  
8                   another area, which you had no badge for.

9                   DR. MAKHIJANI:   Right. And that's  
10                  where I think, Brad, that this -- now that  
11                  you're reminding me, this -- the worker  
12                  interview record is now with you, the incident  
13                  report that we gave you has our worker summary  
14                  attached to it. I just thought there should  
15                  be some report to which our worker interview  
16                  summary is attached. So now there is one.  
17                  And it was --

18                 DR. TAULBEE:     And that's because  
19                 you're going to give us the names of those  
20                 individuals?

21                 DR. MAKHIJANI:   Yes, we'll give

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1 you the names of those individuals. The  
2 summary has been posted on the O: drive for a  
3 long time. But now I also attached it to one  
4 report so that when that thing is PA cleared,  
5 you know, people can see how we handled their  
6 interviews.

7 And yes, so anyways, this came up  
8 during the interviews. Brad is quite right.  
9 And I think this whole question of temporary  
10 badges, picking up somebody's badge, or some  
11 badge that was not attributed to the  
12 particular worker arose. If memory serves me  
13 right, at least partly in this context.

14 And there was a special issue with  
15 the way badge racks, especially in the H area  
16 were in contaminated areas. And the badges  
17 weren't stored inside a protected area. So  
18 then they would -- anyway, there is an issue  
19 there about the accuracy of the things and how  
20 the badges were handled. So there is a badge  
21 handling problem that is actually particular

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1 to the H area and not to the -- area because  
2 of the way the structure was constructed.

3 Then there was a more general  
4 exposure geometry. Some people were wearing  
5 ring dosimeters, and others were not. I mean  
6 you have a geometry issue generally. And I  
7 didn't try to go into it in great detail.

8 CHAIRMAN GRIFFON: Is that -- is  
9 that -- going back to that badge issue. Is  
10 the issue that the control was stored in a  
11 contaminated area and therefore --

12 DR. MAKHIJANI: No, well the issue  
13 -- the issue was that the badges were stored  
14 in a place where they could become  
15 contaminated or read when they were not being  
16 worn. And then the badges would be taken away  
17 and replaced by fresh badges. And so the  
18 question comes in as to what dose was actually  
19 attributed to the worker whose badge was  
20 stored there.

21 CHAIRMAN GRIFFON: Okay. We can

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1 wait -- yes, we wait and look at the report.

2 DR. MAKHIJANI: Yes.

3 CHAIRMAN GRIFFON: Usually those  
4 kinds of issues are if the control was stored  
5 in a contaminated area and you were going to  
6 subtract the control --

7 DR. TAULBEE: The controls were  
8 always stored with the badges.

9 CHAIRMAN GRIFFON: -- then you  
10 were going to subtract the controls -- yes,  
11 they were together. So in that case --

12 DR. MAKHIJANI: No, what it says  
13 here is that worker badges in the H area would  
14 be wiped out by passing radioactive trucks so  
15 that then the badge itself would be kind of  
16 compromised and rejected and replaced by a new  
17 badge. And so the badge is unreadable.  
18 That's the implication of that. We,  
19 ourselves, have not investigated this  
20 question.

21 CHAIRMAN GRIFFON: I was just

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1       trying --

2                   DR. MAKHIJANI:   I'm just reporting  
3       what has been said.

4                   DR. TAULBEE:    As I recall, there  
5       was a few incidents that we noted of that  
6       occurring in the H area and they pulled all  
7       the badges, read them with the control blank  
8       because they were all exposed uniformly.

9                   CHAIRMAN GRIFFON:   Right.

10                  DR. TAULBEE:    And assigned doses  
11       and issued new badges.  So it did happen.

12                  CHAIRMAN GRIFFON:   Okay.  So it  
13       did -- you are aware of that.

14                  DR. TAULBEE:    I'm aware of it.

15                  CHAIRMAN GRIFFON:   Okay.

16                  DR. MAKHIJANI:    So they raised  
17       this issue.

18                  DR. TAULBEE:    It appears they  
19       handled it correctly.

20                  DR. MAKHIJANI:    Yes, right.  And  
21       so -- geometry especially arose -- we had

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1 raised it in the question of the tank farm and  
2 the burning ground. But here it has arisen in  
3 the context of ring badges were not always  
4 worn even when they were needed. There's more  
5 detail, I think, in some of these interviews.

6 There's just a very short mention of it here  
7 since you've already got this geometry issue.

8 There were a whole bunch of issues  
9 related to pencil dosimeters going, you know,  
10 this also familiar question, this happens to  
11 be a question where we, SC&A actually had  
12 investigated this before and gone into the  
13 Special Hazard Incidents Index and checked out  
14 pencil dosimeter questions and compared it  
15 with badge readings.

16 And we actually did not find that  
17 there was an issue of kind of compromising  
18 badge readings or, you know, ignoring high  
19 pencil dosimeter readings or anything like  
20 that. On the contrary, the evidence that we  
21 found was that whenever there were incidents

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1 like that, that they were paying attention to  
2 it.

3 And we didn't investigate ad  
4 infinitum. You know there were a few things  
5 we investigated. And in any case, the  
6 recorded dose is a badge dose. And so we  
7 didn't think that this particular set of  
8 concerns is an SEC-type of issue.

9 And that's the one area where  
10 we've actually given you a conclusion as to  
11 what we think because we've already done a lot  
12 of work on this question from a prior  
13 direction given to us by the Working Group.  
14 So we just put it in the report. And so it is  
15 a little bit more than petitioner-reported  
16 issues in that one case since we have done the  
17 work. And we've given you all the references  
18 to that, of course.

19 So in one particular instance,  
20 somebody said they were a construction worker  
21 and weren't really well monitored -- external

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1 dosimetry, not on a routine program, who then  
2 became an operations workers and was  
3 monitored. And we really didn't know what to  
4 do with that. You know, we didn't know the  
5 exposure conditions. We didn't know the  
6 exposure potential. We didn't know if it was  
7 one case or -- actually I talked about this  
8 with Steve Marschke. And we felt it would be  
9 very, very difficult to investigate this kind  
10 of question. And that's the only judgement we  
11 gave you.

12 It could be there is something  
13 there. But to design an investigation  
14 protocol for this would be extremely hard. So  
15 that's sort of Conclusion No. 2 that we gave  
16 you in this.

17 There was, in the petition, a very  
18 important document of a general nature that we  
19 call attention to, which was a union  
20 representative who kind of -- president of the  
21 Augusta Building and Construction Trades

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1 Council kind of laid down a challenge to NIOSH  
2 in 2003.

3 And he said, you know, we had told  
4 the SRS staff that our people were exposed to  
5 beryllium and they had said no. And then when  
6 workers were tested, there were positive cases  
7 that showed up. And he said if the SRS people  
8 didn't know what our people were exposed to,  
9 how are you going to.

10 And that was a kind of a general  
11 what do you know -- do you know enough to  
12 reconstruct doses. He didn't say you don't  
13 know enough. He just wanted to -- he made a  
14 kind of a fairness issue out of whether SRS  
15 and NIOSH knew enough about construction  
16 workers.

17 And so since we're reporting on  
18 petitioner issues, this was kind of an overall  
19 issue brought up by a representative. So  
20 that's a pretty detailed review of what is in  
21 the report.

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1                   CHAIRMAN GRIFFON:     And, again,  
2     just to summarize, that document just went to  
3     NIOSH, right?

4                   DR. MAKHIJANI:     Yes, two weeks  
5     back.

6                   DR. TAULBEE:     And we'll respond to  
7     it.

8                   CHAIRMAN GRIFFON:     Like the heads  
9     up and notice, the action is NIOSH will  
10    respond to it.

11                  DR. TAULBEE:     Okay.

12                  CHAIRMAN GRIFFON:     Anything else  
13    on the Committee? I do want to give an  
14    opportunity on the phone line, I think there's  
15    some representing the petitioner or some  
16    members of the public. We can take a few --  
17    we can have a few minutes for public comments,  
18    both in the room or on the phone.

19                  I'll ask --

20                  MR. KATZ:     We can start in the  
21    room.

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1                   CHAIRMAN GRIFFON:     Yes, start in  
2     the room here.

3                   Bill, if you --

4                   MR. MCGOWAN:     I would say that  
5     Items 22 and 23 are very common throughout the  
6     sites. I can speak specifically to the three  
7     Oak Ridge Sites, to Portsmouth and Paducah.  
8     We even asked a number of construction workers  
9     if they were asked to wear their badge under a  
10    lead apron. And many said they were. So  
11    these two items are very pervasive.

12                  I've talked to any number of  
13    workers who -- like that tore out the floor in  
14    the half-acre building that was told to be  
15    clean, they tore out the floor, put it in dump  
16    trucks, hauled it to the dump site, came in,  
17    poured a brand new floor. And then came back  
18    the next week and saw the whole place was  
19    roped off with radiation tape. It was  
20    contaminated, and nobody could go in. So  
21    these points are very, very common in my own

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1 interview history and in what I've read  
2 through other sites.

3 CHAIRMAN GRIFFON: Anybody on the  
4 phone want to weigh in? I think Mr. Warren is  
5 on the line. Counselor?

6 MR. WARREN: Yes, I'd like to at  
7 least point out that what's really important  
8 to us is looking at the definition of  
9 construction workers. And when NIOSH finally  
10 sent me the letter this month after asking for  
11 it for it seems like a couple years, the  
12 definition they are using is not close to what  
13 the evidence from the workers would show.

14 And we think we included in the  
15 April 22nd, 2010 letter to Mark, the numbers  
16 of -- the different descriptions of jobs and  
17 the job listings themselves. And it doesn't  
18 look like that NIOSH has incorporated any of  
19 that in there.

20 The construction workers -- Brad  
21 Clawson made some comments in the January 19th

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1 meeting. And he said that he had listened to  
2 these workers, and he said that the Savannah  
3 River Site was set up different from any other  
4 site considered for an SEC. And that is  
5 critical for people to recognize.

6 DuPont had construction workers.  
7 DuPont had maintenance workers. And the non-  
8 trade workers were performing the same jobs as  
9 construction workers. And what we found is  
10 those workers in their radiation exposure  
11 records would have badges -- would have pieces  
12 of paper saying badge fell on the floor. Here  
13 is the estimated millirems that we think he  
14 got. But these things would have happened  
15 over several days.

16 And then construction workers and  
17 DuPont workers would be on one side of the  
18 rope, and the other people would be -- and  
19 there would be a rope -- the other people  
20 would be fully dressed out trying to clean up  
21 something. Or in one case, they dug up a road

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1 and it took three months. But it had been  
2 contaminated for at least a month before  
3 anybody figured it out.

4 So I don't know how to get the  
5 emphasis on what really happened at Savannah  
6 River than what NIOSH thinks happened. And  
7 there are -- in addition to all of that, is  
8 that the SEC process has seen hundreds, if not  
9 thousands, die before they are able to get any  
10 Part B benefits.

11 NIOSH's record is about a 58  
12 percent denial if you look at their figures.  
13 But it looks more like a 65 or 70 percent  
14 denial for Part B cases from my perspective.  
15 But at any rate, now I was interested today to  
16 hear NIOSH say they had all of these claims in  
17 a database.

18 If they have all the claims in a  
19 database, it would be easy enough for them to  
20 track how much -- how many leukemias or how  
21 many thyroid cancers or myeloid, all of the

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1 radiation-sensitive cancers, they could  
2 quickly calculate what was the percentage of  
3 those cases that got an award.

4 And way back in 2002, we asked for  
5 that, and nothing has ever happened. And I  
6 just think that would show that the whole dose  
7 reconstruction process doesn't work. If you  
8 expose people to radiation, you expect a  
9 certain amount of thyroids, a certain amount  
10 of leukemias, and all the other things.

11 And what's happened is the process  
12 has gone along, and they keep their denial  
13 rate going at the cost of hundreds of millions  
14 of dollars. And the workers still don't have  
15 the SEC. So that's my comments.

16 CHAIRMAN GRIFFON: Thank you, Mr.  
17 Warren. And we're definitely -- we're  
18 interested in the construction worker  
19 definition, too. So we're looking at that,  
20 and the job titles are included in there. So  
21 we are also interested in that.

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1 Any other public comments? And  
2 one more for the --

3 DR. MAKHIJANI: Can I say  
4 something to Mr. Warren?

5 CHAIRMAN GRIFFON: Yes.

6 DR. MAKHIJANI: There was actually  
7 another action item that we didn't get to that  
8 relates to Mr. Warren specifically. Remember  
9 he had supplied us with some documents and had  
10 told us -- SC&A to prepare a list of issues.

11 CHAIRMAN GRIFFON: Oh, I'm sorry.  
12 I thought that was in that 22.

13 DR. MAKHIJANI: No, it's not in  
14 22, 23. That's a separate matrix item.

15 CHAIRMAN GRIFFON: Okay, yes.

16 DR. MAKHIJANI: This related to --  
17 this was an additional item at the bottom of  
18 our --

19 CHAIRMAN GRIFFON: Okay.

20 DR. MAKHIJANI: -- action list to  
21 review those and to see to what extent they

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1 overlapped with --

2 CHAIRMAN GRIFFON: We'll add that  
3 on our action list. Yes.

4 DR. MAKHIJANI: No -- yes, so we  
5 had already done that.

6 CHAIRMAN GRIFFON: Okay.

7 DR. MAKHIJANI: That report is  
8 complete. We've listed all of the issues  
9 which came up in the materials that Mr. Warren  
10 had supplied to us as well as in the May 2008  
11 NIOSH public meeting. So there is a short  
12 memo covering -- sort of introducing what we  
13 did. And then there is the list and  
14 categorizing various items in the list.

15 Again, a list that is sort of  
16 without much comment from us except the slot  
17 into which it may belong. But it is a fairly  
18 long list. And you will get that -- it's at  
19 the DOE.

20 CHAIRMAN GRIFFON: Okay.

21 DR. MAKHIJANI: So you'll get that

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1 in a couple of --

2 CHAIRMAN GRIFFON: So you'll have

3 --

4 DR. MAKHIJANI: Yes, it's done.

5 CHAIRMAN GRIFFON: All right. And

6 that's something that NIOSH should consider

7 along with the other --

8 DR. MAKHIJANI: It's something

9 that NIOSH -- yes, actually, you know, it's a

10 rather complicated list because it is

11 individual worker comments. And, you know --

12 because that's the only thing we could do with

13 it. There were lots and lots of individual

14 things that came up.

15 We've binned them wherever they

16 belonged in an existing matrix item like -- or

17 external doses --

18 CHAIRMAN GRIFFON: Okay.

19 DR. MAKHIJANI: -- and so on.

20 We've indicated that in a table. But then

21 there are these kind of issues that --

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1                   CHAIRMAN GRIFFON:     Don't really  
2     fit in anywhere.

3                   DR. MAKHIJANI:    -- may or may not  
4     belong.   And that's a judgment that we felt  
5     that maybe you should make.

6                   CHAIRMAN GRIFFON:   Oh, we'll look  
7     at it as a Work Group, I think, once it comes  
8     out.

9                   DR. MAKHIJANI:    Yes.

10                  CHAIRMAN GRIFFON:     And we'll  
11     consider whether we need to add it to our  
12     items, right?

13                  DR. MAKHIJANI:    Yes, right.  It is  
14     something that I think we'd look at as an  
15     item.

16                  CHAIRMAN GRIFFON:     And I'd ask  
17     NIOSH to also consider the binning, you know.  
18     If they are included in other existing matrix  
19     items, then we'll just include them in that  
20     discussion of those items.

21                  DR. MAKHIJANI:    Right.  Wherever

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1 it was clear, we've indicated that.

2 CHAIRMAN GRIFFON: Yes, okay.

3 DR. MAKHIJANI: But some places it  
4 wasn't clear, and we created some new  
5 categories just to kind of --

6 CHAIRMAN GRIFFON: So at least  
7 review the memo. I'm not sure there's any  
8 specific action at this point other than to  
9 review it. And we'll discuss potential  
10 inclusion of some of the items at the next  
11 meeting.

12 DR. MAKHIJANI: Yes.

13 CHAIRMAN GRIFFON: Okay.

14 DR. MAKHIJANI: It is a fairly --

15 CHAIRMAN GRIFFON: All right.

16 Thank you, Arjun.

17 DR. MAKHIJANI: -- short memo with  
18 a long -- with a long appendix at the end.

19 CHAIRMAN GRIFFON: Yes.

20 DR. MAKHIJANI: Which is what you  
21 had wanted.

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1                   CHAIRMAN GRIFFON:       Okay.       All  
2       right. Thank you.

3                   All right.     If there is no more  
4       public comments, I think we're ready to close.

5       Do we want to --

6                   MEMBER CLAWSON:   Mark?

7                   CHAIRMAN GRIFFON:   Yes?

8                   MEMBER CLAWSON:   This is Brad.   I  
9       just had a question for Tim.

10                  CHAIRMAN GRIFFON:   Go ahead.

11                  MEMBER CLAWSON:   Well, earlier he  
12       was talking about that he had this data but,  
13       you know, it wasn't ready to be able to come  
14       forth. And my understanding is that NIOSH has  
15       got like a Y: drive or something like this  
16       where they prepare all their information.

17                  How much data do we still have  
18       sitting out there that hasn't been put onto  
19       the O: drive for us to be able to review? Is  
20       there a substantial amount, or is everything  
21       on the O: drive?

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1 DR. TAULBEE: Well, I would say  
2 the things that we have not put out there yet  
3 would be the complete uranium, plutonium,  
4 americium, curium, the mixed fission products  
5 --

6 DR. MAKHIJANI: Neptunium.

7 DR. TAULBEE: -- and neptunium  
8 data sets. I think those are the ones we have  
9 not put up there.

10 CHAIRMAN GRIFFON: And we just  
11 requested those today.

12 DR. TAULBEE: Yes, right.

13 MR. MAHATHY: The NTA data set?

14 DR. TAULBEE: And the NTA data  
15 set, yes. Thanks, I forgot about that one.

16 MEMBER CLAWSON: Well, the reason  
17 I was just wondering, Tim, is because, you  
18 know, this sharing of information and so  
19 forth, I just want to make sure that we all  
20 have the same information.

21 DR. TAULBEE: I understand.

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1 MEMBER CLAWSON: Okay.

2 DR. TAULBEE: You know, I mean --  
3 okay.

4 CHAIRMAN GRIFFON: We're working  
5 on that. I think also -- I think when you're  
6 constructing a database, we don't want --

7 DR. TAULBEE: That's correct.  
8 When we get the data coded, that's one stage.

9 CHAIRMAN GRIFFON: Right.

10 DR. TAULBEE: And then we do a QA  
11 --

12 CHAIRMAN GRIFFON: Right.

13 DR. TAULBEE: -- a quality control  
14 assurance check of that data. And in some  
15 cases, they have to go back and -- in fact, in  
16 some they have re-coded the whole data set  
17 again.

18 CHAIRMAN GRIFFON: And I  
19 appreciate that because I don't want SC&A to  
20 start to look at some data set that, you know  
21 --

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1 MR. KATZ: Isn't ready.

2 CHAIRMAN GRIFFON: -- isn't V&Ved  
3 by NIOSH, right. So --

4 DR. TAULBEE: Oh, yes.

5 CHAIRMAN GRIFFON: -- but we are -  
6 - good point, Brad. And they're posting --

7 MEMBER CLAWSON: Okay. I was just  
8 wondering because I just wanted to make sure  
9 that the SC&A and also the Board had access  
10 to, you know, all the information that we were  
11 dealing with.

12 DR. MAKHIJANI: Yes. That also  
13 reminds me that you had asked us to review the  
14 four log books.

15 CHAIRMAN GRIFFON: Yes.

16 DR. MAKHIJANI: That's complete.  
17 I believe that's at the DOE, too.

18 CHAIRMAN GRIFFON: What did that  
19 fall under? What action item? Or what matrix  
20 item?

21 DR. MAKHIJANI: It fell under

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1 matrix -- I think we skipped it.

2 DR. TAULBEE: Actually, I think it  
3 is 22 and 23, isn't it?

4 DR. MAKHIJANI: No, it's on some  
5 other earlier action item.

6 MR. KATZ: I didn't note it when I  
7 went through.

8 MEMBER SCHOFIELD: Mack, come  
9 here. Come on, Mack.

10 DR. MAKHIJANI: Let me just search  
11 for log books here.

12 CHAIRMAN GRIFFON: Phil, you got  
13 your dog?

14 (Laughter.)

15 CHAIRMAN GRIFFON: Maybe Mack is  
16 his son, I don't know.

17 MEMBER CLAWSON: It sounds like  
18 Phil catching his dog.

19 DR. MAKHIJANI: It's in Item 13.

20 MEMBER SCHOFIELD: Yes, I was  
21 catching my dog there. I forgot I didn't have

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1 it on mute right then.

2 CHAIRMAN GRIFFON: Item 13, yes.

3 DR. MAKHIJANI: Item 13.

4 CHAIRMAN GRIFFON: Log book  
5 review.

6 DR. MAKHIJANI: That is complete.

7 CHAIRMAN GRIFFON: Item 13, log  
8 book review.

9 DR. MAKHIJANI: It is complete. I  
10 can give you a little vignette of it if you  
11 want.

12 CHAIRMAN GRIFFON: Yes, please,  
13 please, yes. Sorry I missed that.

14 DR. MAKHIJANI: We had -- so we  
15 looked at what NIOSH did. And then what we  
16 did with those log books is we took a sort of  
17 a deeper look into just those four log books,  
18 compiled, you know, the data for all the  
19 claimants that were there -- all the data for  
20 the claimants that were there in the log  
21 books, compiled all the positive data.

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1                   We found a fair number of missing  
2 records. Things that were there in the log  
3 books that were not there in the individual  
4 worker records. Overall, it was a few percent  
5 -- six percent.

6                   And we parsed into the  
7 construction workers and non-construction  
8 workers. The construction workers was much  
9 more missing data than non-construction  
10 workers. But when we looked into it more  
11 deeply, it turned out that almost all of the  
12 missing points were for one worker.

13                   And so then we -- so we did two  
14 analyses. We gave you a full analysis. And  
15 there were like 70-odd points. I don't know  
16 what happened there. But there were 70-odd  
17 points, bioassay data points for uranium, and  
18 this was only uranium, that were there in the  
19 log books that were not there in the worker's  
20 individual dose record.

21                   And we did a full quality control

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1 check of everything. That's why it took so  
2 long. I wanted to make sure --

3 CHAIRMAN GRIFFON: You have this  
4 in the form of a report?

5 DR. MAKHIJANI: Yes, we have this  
6 in the form of a report.

7 CHAIRMAN GRIFFON: Is it being  
8 reviewed?

9 DR. MAKHIJANI: It's complete. I  
10 think it is at the DOE.

11 CHAIRMAN GRIFFON: Okay.

12 DR. MAKHIJANI: So you'll get this  
13 very soon.

14 CHAIRMAN GRIFFON: It's coming.

15 DR. MAKHIJANI: So you'll get two  
16 reports this month that have been completed.  
17 The actual missing for construction workers  
18 was actually quite small. Only about one  
19 percent. For non-construction workers, it was  
20 actually higher, about six percent.

21 There were four workers for whom

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1 none of the data points in the log books for  
2 those -- that period and those areas, were in  
3 there. So there's a kind of a dose  
4 reconstruction question of missing data from  
5 the individual worker data and because you are  
6 normally doing MDA divided by two when you do  
7 internal dose reconstruction.

8 A few issues arose -- yes, so it  
9 is kind of a little bit of a mixed bag.  
10 There's some reassurance in there and then  
11 some kind of --

12 CHAIRMAN GRIFFON: How do they  
13 compare? I mean the original log book  
14 analysis, NIOSH looked at the log books  
15 compared to the database or to the --

16 DR. MAKHIJANI: Yes, you did the  
17 same. I think you looked at the claimant  
18 records.

19 DR. TAULBEE: We came up with  
20 something like on the five percent range.

21 DR. MAKHIJANI: -- not that

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1 different. Actually we thought that some of  
2 the data points that NIOSH thought weren't in  
3 there were in there. So we had a few -- a  
4 couple of corrections here and there, but we  
5 didn't have much issue with NIOSH's analysis.  
6 We just kind of looked at the log books as a  
7 whole and tried to give you a picture of  
8 what's in there.

9 CHAIRMAN GRIFFON: So when we see  
10 it, I guess we'll have to discuss it.

11 DR. MAKHIJANI: Yes.

12 CHAIRMAN GRIFFON: All right.

13 DR. MAKHIJANI: So obviously  
14 there's some good news and some bad news.

15 CHAIRMAN GRIFFON: I think NIOSH,  
16 once they get it, will review that. That's an  
17 action item under Item 13.

18 MR. KATZ: Okay.

19 CHAIRMAN GRIFFON: Did we miss any  
20 others?

21 DR. MAKHIJANI: I don't think so.

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1 MR. MCGOWAN: Number 24?

2 DR. MAKHIJANI: Twenty-four was  
3 merged -- there's no action item on 24.

4 CHAIRMAN GRIFFON: Yes, there  
5 wasn't an action item.

6 DR. MAKHIJANI: And 25 was merged.

7 CHAIRMAN GRIFFON: Merged to --  
8 yes.

9 DR. MAKHIJANI: Twenty-five was  
10 burning ground. It was the same thing as  
11 another issue. It was by mistake.

12 CHAIRMAN GRIFFON: And what was --  
13 there was no action. But was it closed,  
14 Number 24, the early monitoring data question?

15 DR. MAKHIJANI: Yes, you know, I  
16 think to my memory -- now this is really  
17 pushing it a little bit, Mark, to my memory,  
18 what has happened is when NIOSH first -- when  
19 we first started looking at this americium,  
20 curium, californium, and there was some  
21 claimant data, I think, you know, the question

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1 of early monitoring became kind of merged into  
2 looking at the completeness of these data in  
3 various periods.

4 That's the reason I raised it  
5 earlier on when we covered those items.  
6 Because from my memory, data in some periods  
7 were pretty sparse. So I think this item went  
8 away as a separate item because basically it's  
9 subsumed under whether you have bioassay data  
10 for these radionuclides from the early  
11 periods.

12 CHAIRMAN GRIFFON: So it's --  
13 maybe we should --

14 DR. MAKHIJANI: I don't believe we  
15 have an external monitoring early issue  
16 because as part of TIB-52, we looked at the  
17 Fairweather database, which was the early  
18 database and the late database. And we didn't  
19 think there was an issue there.

20 CHAIRMAN GRIFFON: So Item 24 was  
21 merged with other nuclides.

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1 DR. MAKHIJANI: Yes, effectively,  
2 I think --

3 CHAIRMAN GRIFFON: Okay.

4 DR. MAKHIJANI: -- I think it just  
5 says there no action item reported, but I  
6 think basically what has happened, to the best  
7 of my memory, is it has gotten merged into the  
8 individual --

9 CHAIRMAN GRIFFON: Would you  
10 agree, Tim?

11 DR. TAULBEE: I would agree.

12 CHAIRMAN GRIFFON: I just want to  
13 make sure just because it doesn't say closed.  
14 It says --

15 DR. MAKHIJANI: You know I will --  
16 you know, since we're on it, let me just look  
17 at what the matrix actually said because now  
18 we're looking at my summary descriptions of  
19 what's in the matrix. And I'm a little  
20 uncomfortable. But give me just a second to  
21 look at the matrix.

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1 Oh, this only goes up to 23.

2 MR. KATZ: Twenty-four is right in  
3 the front.

4 DR. MAKHIJANI: Oh, 24 is in the  
5 front. Oh, thank you.

6 Lack of early monitoring data for  
7 many workers and radionuclides by a number of  
8 devices, including building coworker models  
9 and so on. Yes, I think this really is  
10 subsumed in the other. It mentions neutrons  
11 here, and it mentions radionuclides. Early  
12 monitoring data for neutrons.

13 And I think this list, as you  
14 recall, was developed from our TBD review.  
15 And there is a separate item in the TBD review  
16 that said early monitoring data, which is why  
17 it showed up here in this way. But I do think  
18 it has been subsumed into the other action  
19 item and into the other matrix item.

20 MR. MCGOWAN: Perhaps you could  
21 post on the website a more current issue of

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1 this? This is from September 2009.

2 MR. KATZ: Mr. Warren, you're not  
3 on mute.

4 CHAIRMAN GRIFFON: Yes, well, I  
5 think that's a good idea, Phil. We should  
6 update the matrix because we've been doing  
7 this list of actions and issues --

8 DR. MAKHIJANI: Yes, I agree.

9 CHAIRMAN GRIFFON: So we should  
10 roll these -- and who should do that?

11 DR. MAKHIJANI: What's your  
12 pleasure?

13 MR. MCGOWAN: And this setting has  
14 an Item 25, environmental dose?

15 DR. MAKHIJANI: Yes, and it is  
16 being merged into the burning ground.

17 CHAIRMAN GRIFFON: Right. So it  
18 should be -- yes, we need to re-post that  
19 because we've sort of converted over to this  
20 action list, but we haven't updated the  
21 matrix. So who was it originally --

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1 DR. MAKHIJANI: We prepared it  
2 originally.

3 CHAIRMAN GRIFFON: All right. So  
4 -- and let's do the same thing. SC&A will  
5 update the matrix, but we're going to -- with  
6 the action list. And I'm assuming you'll pass  
7 it by each other to check on it. But we'll  
8 re-post it. Yes. Okay.

9 Anything else for this --

10 DR. MAKHIJANI: And it will be  
11 posted on the DCAS website.

12 CHAIRMAN GRIFFON: I'm assuming it  
13 has to go through the normal reviews, right?

14 MR. KATZ: What will be posted?  
15 What are we talking about posting?

16 DR. MAKHIJANI: The matrix.

17 MR. KATZ: We don't post matrices.

18 CHAIRMAN GRIFFON: Oh, we don't  
19 post them?

20 DR. MAKHIJANI: We've been working  
21 from a posting.

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1 MR. MCGOWAN: On NIOSH website  
2 where we have your minutes and --

3 DR. NETON: Did you get that  
4 matrix off the website? Because we don't  
5 normally post it on the website.

6 CHAIRMAN GRIFFON: He got it off  
7 the website.

8 DR. NETON: That's unusual that we  
9 do that.

10 MR. MCGOWAN: We got a lot of  
11 things from DOE off the website before 9/11,  
12 too.

13 DR. NETON: Well, I know. I'm not  
14 saying it's wrong. I guess that we -- it's  
15 typically not been our practice to do that.  
16 I'm surprised.

17 DR. MAKHIJANI: I was not aware  
18 that it was there.

19 DR. TAULBEE: I think it was an  
20 SC&A document that you initially created. And  
21 so you posted it.

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1 DR. MAKHIJANI: We don't post  
2 documents on your site.

3 DR. NETON: No.

4 DR. TAULBEE: No, but I mean you  
5 issued it, and there was --

6 DR. NETON: The matrix was  
7 effectively a document of yours that we  
8 posted.

9 CHAIRMAN GRIFFON: That could have  
10 been.

11 DR. NETON: I bet that's how.

12 CHAIRMAN GRIFFON: At any rate, so  
13 make sure that Bill gets an updated version.  
14 And we need to update it for the Work Group.

15 DR. MAKHIJANI: Yes, we will  
16 definitely update it. And then what Ted wants  
17 to do with it and what you want to do with it  
18 is kind of --

19 CHAIRMAN GRIFFON: Okay.

20 DR. MAKHIJANI: It doesn't have to  
21 go through -- I don't imagine it would have to

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1 go through DOE review because --

2 MR. KATZ: No, but everything that  
3 gets sent to the public has to go through PA  
4 clearance.

5 DR. MAKHIJANI: Yes.

6 CHAIRMAN GRIFFON: Okay. Is there  
7 anything else from the Committee Members?

8 All right. If there's nothing  
9 else, then this meeting is adjourned.

10 DR. TAULBEE: I guess should we  
11 schedule another meeting?

12 CHAIRMAN GRIFFON: Well, I thought  
13 it would make more sense to try to schedule  
14 once we're in Augusta.

15 DR. TAULBEE: Okay.

16 CHAIRMAN GRIFFON: Because you'll  
17 have your action list updated.

18 DR. TAULBEE: Okay.

19 CHAIRMAN GRIFFON: And, you know,  
20 I don't want to schedule something for March,  
21 for instance.

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1 MR. KATZ: You'll be in Augusta.

2 So that will work out.

3 CHAIRMAN GRIFFON: Yes, okay. All  
4 right. So we'll adjourn the meeting. Thank  
5 you.

6 MR. KATZ: We're adjourned. Thank  
7 you everyone on the line.

8 (Whereupon, the above-entitled  
9 matter went off the record at 2:48 p.m.)

10

11

12

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