

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

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES  
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SAFETY AND HEALTH

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ADVISORY BOARD ON RADIATION AND  
WORKER HEALTH

+ + + + +

WORK GROUP ON TBD 6000

+ + + + +

THURSDAY  
JUNE 14, 2012

+ + + + +

The Work Group convened telephonically at 9:00 a.m., Paul L. Ziemer, Chairman, presiding.

PRESENT:

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

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ALSO PRESENT:

2

TED KATZ, Designated Federal Official  
DAVE ALLEN, DCAS  
BOB ANIGSTEIN, SC&A  
JENNY LIN, HHS  
JOHN MAURO, SC&A  
DAN MCKEEL  
JIM NETON, DCAS  
JOHN RAMSPOTT  
MUTTY SHARFI, ORAU Team  
JOHN STIVER, SC&A

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P-R-O-C-E-E-D-I-N-G-S 4

(9:02 a.m.)

MR. KATZ: Welcome, everyone, good morning. Advisory Board on Radiation Worker Health. It's TBD-6000 Work Group. We are going to be discussing GSI residual period during this Work Group meeting. And let's begin with roll call.

(Roll call.)

CHAIRMAN ZIEMER: Okay. Thank you very much. The focus of our meeting today is on the residual period for General Steel Industries. The agenda was distributed and is also posted online. Also, the other documents referred to, I'll just very quickly mention them sort of in the order that we received them.

We have a May 30th document from SC&A called, Update of Review of Site Profile for Atomic Weapons Employees that Worked Uranium and Thorium Metals, Appendix BB,

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1 General Steel Industries, Battelle TBD-6000<sub>g</sub>  
2 Appendix BB, Occupational Internal Dose.  
3 That's the title on the paper.

4 We have a June 8th document from  
5 NIOSH entitled, Battelle TBD-6000, Appendix  
6 BB, General Steel Industries Response to SC&A  
7 Memo, dated May 30th, 2012. We have a  
8 document dated June 1st from the co-petitioner  
9 called, Petitioner Comments on SC&A Discussion  
10 Paper, dated 5/30/12, and gives the title of  
11 the SC&A paper, and that's by Dan McKeel.

12 And then we have a June 11th  
13 report, again, from SC&A called, Reply to  
14 NIOSH Response to SC&A Memo dated May 30th,  
15 2012. Also, just for reference, the updated  
16 resolution matrix for Petition 00105, the June  
17 1st version of that, which also has been  
18 distributed.

19 So what the intent was was to have  
20 SC&A begin with their review on the residual  
21 period. Now, keep in mind that there was an

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1 original review and it wasn't clear to me that  
2 it was very specific. There weren't any  
3 findings on that residual period in that  
4 review and it wasn't clear, exactly, what  
5 SC&A's position was relative to the NIOSH  
6 recommendation.

7 So Bob Anigstein was asked to  
8 clarify the SC&A position, and that initiated  
9 this series of papers. There's been some  
10 changes, as I understand it, in SC&A's  
11 position since the first paper, but let's let  
12 Bob go ahead and kick this off. And, Bob, you  
13 can updated as you go if you wish, because  
14 things have changed a little bit on the SC&A  
15 view as you went along.

16 MR. KATZ: Paul? This is Ted, I  
17 thought you had wanted Dave to provide the  
18 initial presentation, cover the initial --

19 CHAIRMAN ZIEMER: That's right.  
20 I'm sitting here looking at an earlier draft  
21 of the agenda and I apologize for that. Dave

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1 can go ahead and kick this off. Right. 7

2 MR. ALLEN: Okay. Thanks, Paul.

3 This is Dave Allen, NIOSH. I was just going  
4 to briefly go over the White Paper I wrote on  
5 June 8th, and some of that was in response to  
6 SC&A's --

7 CHAIRMAN ZIEMER: Right.

8 MR. ALLEN: -- review, so I think  
9 Bob will then go over the update of that.

10 CHAIRMAN ZIEMER: Right.

11 MR. ALLEN: He can cut in if I say  
12 something wrong.

13 DR. ANIGSTEIN: No. I'll let you  
14 finish.

15 MR. ALLEN: The White Paper I  
16 wrote, part of that went over the methodology  
17 and the appendix, right now, for the residual  
18 period, so I just wanted to go over that, just  
19 briefly, to describe how that estimates dose.

20 It starts by using TBD-6000 slug  
21 production. The reason that was chosen is

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1 that is handling quite a bit of uranium metal,  
2 that process, that is essentially what GSI did  
3 was handle uranium metal as far as airborne  
4 contamination.

5 And in slug production, it's  
6 actually the oxides of uranium metal that are  
7 inhaled. Nobody inhales a slug, or a 300-  
8 pound derby, or anything. Oxides are somewhat  
9 proportional to the surface area of the metal  
10 and slugs are smaller, have a lot more surface  
11 area, so that portion of it should be higher  
12 or bounding on GSI, since they handled larger  
13 pieces of uranium metal than slugs.

14 Also, the slug production dealt  
15 with cutting and grinding on the metal, which  
16 was, by far, the highest airborne-causing  
17 operation in slug production. And GSI X-rayed  
18 uranium metal without actually manipulating  
19 the metal as far as cutting, grinding, or any  
20 kind of abrasion.

21 So this was described in the

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1 appendix that the slug production should be  
2 bounding on GSI. In TBD-6000, that is assumed  
3 to be a full-time operation, the slug  
4 production, and GSI uranium work was not full-  
5 time, so it was prorated to the time frames in  
6 the appendix of uranium work.

7 It was also assumed that the  
8 motive force to actually get this oxidation  
9 off of the uranium and into the air was only  
10 present while people were handling the uranium  
11 and it wasn't present while it was sitting  
12 there being X-rayed.

13 So in the appendix, we took the  
14 slug production airborne concentration was  
15 present in the air the whole time the uranium  
16 might have been handled and let that settle on  
17 to the floor to calculate a surface  
18 contamination level.

19 Then we resuspended that with a 1  
20 times 10 to the minus 6th resuspension factor  
21 to calculate airborne activity. That was what

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1 we used for the residual period. 10

2 Also, calculated an external dose  
3 from that surface contamination, but that  
4 turns out to be fairly low, and then we  
5 realized it is possible to get contamination  
6 and concentrate it in one air and increase  
7 that external dose rate in a localized area.

8 And we found that that is what  
9 happened at GSI and they had a vacuum cleaner  
10 that had an external dose rate study. They had  
11 a small external dose rate coming from a  
12 vacuum cleaner from uranium inside it.

13 Still fairly small because,  
14 uranium, you don't get a great deal of  
15 external dose, and therefore, we just used  
16 that dose rate since it was higher than the  
17 calculated dose rate from surface  
18 contamination, and we used that for the full-  
19 time in the residual period.

20 With that explanation, I think  
21 that answered a couple of misunderstandings on

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1 the original SC&A review on how we had did our  
2 dose estimate, and I think Bob will probably  
3 speak to that.

4 I also mentioned, in my White  
5 Paper, in response to SC&A's first White  
6 Paper, that the times that we worked with  
7 uranium, that's somewhat in debate there.  
8 What we did was took those purchase orders  
9 based on the hourly rate and the monthly value  
10 on it.

11 We calculated a maximum monthly  
12 hours that they could have been working with  
13 uranium under those purchase orders. And, in  
14 general, in the beginning, it was \$450 per  
15 month.

16 That very first purchase order for  
17 four months was actually \$500, and I believe  
18 the other year was actually just an annual  
19 limit that didn't add up to that, and it was a  
20 little higher, so we increased that year.

21 In the later years, the limits

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1 started going down quite a bit, but \$450 is  
2 the general rule, and the thinking was that  
3 they started off with \$500 a month for four  
4 months, and then dropped it to \$450, and kept  
5 it at that level.

6 So we were thinking that the \$500  
7 was an estimate and the \$450 was what they  
8 reduced it to as a limit, so we were thinking  
9 that that is, essentially, what they learned  
10 from that first four months that they needed.

11 And, yes, I don't think there is agreement on  
12 that, but that is what we did in the appendix.

13 And I spelled out, basically, that  
14 reason and pointed out that the rest of the  
15 purchase orders were on a fiscal year basis,  
16 but this first one started off in March, so it  
17 was only for a four-month period, and it  
18 appeared to be the start-up of, or probably  
19 restart of, some work.

20 And I pointed to a memo, a couple  
21 memos, that indicated some work that was done

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1 in February, and it wasn't much. Doesn't<sub>13</sub>  
2 really say uranium, but the timing all seemed  
3 to work out to where that looked like it  
4 probably was that positive. It was just one  
5 more piece of information.

6 And I believe Bob also pointed out  
7 in his review that we didn't base the external  
8 doses in the appendix on 3250 work hours per  
9 year, and we agree.

10 I mean, all the calculations we  
11 had done for the operational period for, you  
12 know, the Work Group, with those last several  
13 White Papers, et cetera, are all based on 3250  
14 hours per year, and that is what we intend to  
15 do with the residual period also when we get  
16 everything resolved and revise the appendix.

17 I think that's all the overview I  
18 intended to give there. I'm open to any  
19 questions or we can go to Bob.

20 CHAIRMAN ZIEMER: Okay. Let's see  
21 if there's any general questions for Dave

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1 Allen first, and then we'll go on to Bob. 14

2 MEMBER POSTON: Paul, this is John  
3 Poston.

4 CHAIRMAN ZIEMER: Yes.

5 MEMBER POSTON: I just had a quick  
6 question on one of the things in Dave's report  
7 I was working through. It's on Page 1. It's  
8 the bottom paragraph. And I believe there's a  
9 unit missing there, because if you do a unit  
10 analysis, it doesn't come up d per m per day.

11 And that's just a correction --

12 CHAIRMAN ZIEMER: You're talking  
13 about the paragraph that begins with 198 d per  
14 m per cubic meter, right?

15 MEMBER POSTON: Right. And as you  
16 go across, after fraction of time in vicinity  
17 of the uranium, it should say one year per 365  
18 days to make the units work out. It's  
19 probably just a typo. I mean, I think the  
20 numerical values are correct, but the units  
21 don't work out unless you put a year in there

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1 somewhere. 15

2 MR. ALLEN: Oh, I see what you're  
3 saying. Yes, I think you're right. It should  
4 have said, the real conversion would have been  
5 365 days per year.

6 MEMBER POSTON: Right.

7 MR. ALLEN: I didn't put per year  
8 in there.

9 MEMBER POSTON: Yes.

10 CHAIRMAN ZIEMER: Oh, yes. The  
11 365 is there, but the year part isn't.

12 MEMBER POSTON: Right. Yes.

13 CHAIRMAN ZIEMER: Yes.

14 MEMBER POSTON: So that's just a  
15 correction that needs to be made to make it  
16 accurate.

17 CHAIRMAN ZIEMER: Right.

18 MEMBER POSTON: And it says here,  
19 but I just want to hear a yes anyway,  
20 basically, you were talking about the intakes  
21 between operations. It says you assume the

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1 maximum air concentration existed the entire<sup>16</sup>  
2 time the workers went in the area.

3 You took an average of that, is  
4 that what you're telling me? That's on Page  
5 2, first paragraph, last line.

6 MR. ALLEN: All I was trying to  
7 say there is, essentially, in the appendix, we  
8 estimated 15 minutes to set up the shot and 15  
9 minutes to take it down.

10 MEMBER POSTON: Yes.

11 MR. ALLEN: So I think it was 30,  
12 30, and then an hour to take the shot. And we  
13 assumed that whole time that they were in  
14 there that it was a 198 dpm per cubic meter,  
15 you know, from the second that started.

16 MEMBER POSTON: Yes. Okay. I  
17 just wanted to clarify that. That's what I  
18 got from this, but that's a pretty generous  
19 assumption, don't you think?

20 MR. ALLEN: Well, actually, I  
21 don't think that one's too generous because

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1 when you're dealing with the settling, I mean,<sup>17</sup>  
2 we also assumed that it disappeared instantly  
3 when they walked out of the room, which is  
4 also not true.

5 MEMBER POSTON: Oh, yes. Okay.

6 MR. ALLEN: When you're talking  
7 about the settling, it's a build-up, and it's  
8 a drop-off, and you --

9 MEMBER POSTON: Yes. It depends  
10 on the particle size and all that other stuff,  
11 yes.

12 MR. ALLEN: Yes.

13 MEMBER POSTON: Okay. I just  
14 wanted to make sure I understood exactly what  
15 you were saying.

16 CHAIRMAN ZIEMER: You're dealing  
17 with it as if it's a step function.

18 MEMBER POSTON: Yes.

19 CHAIRMAN ZIEMER: It starts off at  
20 the top and it stays there continuously till  
21 they leave.

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1                   MEMBER POSTON: Yes. It's like<sup>a</sup><sub>18</sub>  
2 switch. When you walk in the door, it goes to  
3 maximum.

4                   CHAIRMAN ZIEMER: Right.

5                   MEMBER POSTON: When you walk out,  
6 the door, it goes to zero.

7                   CHAIRMAN ZIEMER: Right.

8                   MEMBER POSTON: Okay. All right.  
9 I understand.

10                  DR. MCKEEL: Dr. Ziemer, this is  
11 Dan McKeel, may I make a comment?

12                  CHAIRMAN ZIEMER: Sure.

13                  DR. MCKEEL: Dave mentioned, when  
14 he was reviewing what was done at the slug  
15 production facility, he made a comment that  
16 there was no cutting, grinding, or abrasion of  
17 uranium at GSI.

18                  And one of the points that I want  
19 to reinforce is that, although that was not  
20 done as a machining operation, those large  
21 slugs, I mean, the large ingots and dingots

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1 that were brought over from Mallinckrodt, and<sup>19</sup>  
2 even the betatron slices, were so heavy that  
3 they had to be picked up and handled by chain  
4 men and by chains.

5 And, of course, those chains were  
6 hanging down from a crane, the ingots and  
7 dingots were swinging, and, undoubtedly, those  
8 chains scraped the outer surface of the ingots  
9 and dingots which had not been cleaned of  
10 their outer crust.

11 So a point that I think has been  
12 ignored throughout this consideration of GSI,  
13 but it is mentioned by SC&A in their White  
14 Paper, that there was a long path through  
15 General Steel by which the uranium from  
16 Mallinckrodt traversed, even before it got to  
17 the betatron buildings.

18 So, you know, it had to come to  
19 the loading docks, we know that it was stored  
20 before and after it got there, it had to be  
21 loaded onto their railroad transfer cars,

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1 taken along the railroad tracks, which<sup>20</sup>  
2 traversed many of the buildings beside the  
3 foundry, through Buildings 6, 7, 8, 9, 10.

4 The railroad tracks from Building  
5 10 went into the new betatron building, so the  
6 ORNL assumption in 1989 that the only areas  
7 that had uranium contamination were the old  
8 and new betatron buildings must have been a  
9 cost containment sort of consideration,  
10 because anybody who thinks about the process  
11 for uranium handling at GSI has to recognize  
12 that there were long pathways that probably  
13 were contaminated by chafing and scraping by  
14 the chains on those large ingots, dingots, and  
15 betatron slices.

16 So I think that is a major lack of  
17 the analysis of the residual period. There is  
18 zero data on uranium surveys at GSI. Real  
19 uranium survey, radiologic data, from 1952,  
20 when the first machine, betatron government-  
21 owned machine, was there until the ORNL survey

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1 of the old and new betatron buildings in 1989<sub>21</sub>

2 So the idea that, somehow, the  
3 dust content in a small industrial vacuum 23  
4 years after the plant closed is, in any way,  
5 indicative of the residual contamination in  
6 that plant is really, scientifically speaking,  
7 ridiculous, absurd, and really unacceptable.

8 The proper way to look at things  
9 is, there is really no representative residual  
10 period real data; air monitoring, surface  
11 concentrations. You know, we do know from  
12 worker testimony that that building, the old  
13 betatron building for instance, had been  
14 power-washed in the intervening years back in  
15 the '70s, and that small vacuum was used  
16 repeatedly, we are told, you know, every day  
17 it was emptied and so forth.

18 So all that represents is the  
19 residual uranium dust in that vacuum when it  
20 was probably last used. Nobody even knows  
21 when it was last used. And the other point

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1 is, there were other vacuums, and the one that<sup>22</sup>  
2 was really used to clean the floor in the old  
3 betatron building was much larger, and that  
4 one, there's no measurement of that.

5 So I think those points need to be  
6 put on the record. Thank you.

7 CHAIRMAN ZIEMER: Okay. Thanks,  
8 Dan. One connection, Dave, could you clarify  
9 the application of the activity that you're  
10 proposing. Who would this apply to, the air  
11 concentrations that you're proposing?

12 MR. ALLEN: Air concentrations and  
13 the external would apply to everybody at GSI.

14 CHAIRMAN ZIEMER: Everybody. So  
15 in a certain sense, it is considered to be  
16 present all along the pathway that Dr. McKeel  
17 mentioned, right?

18 MR. ALLEN: The assumption was  
19 that you got different carts that it might  
20 have come in on and different paths.

21 CHAIRMAN ZIEMER: Right.

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1 MR. ALLEN: But it all ended up <sup>in</sup><sub>23</sub>  
2 the betatron building, so that should be the  
3 higher area.

4 DR. MCKEEL: This is Dan McKeel  
5 again, I think that assumption, again,  
6 scientifically speaking, is unwarranted. You  
7 don't know that the highest concentration is  
8 in the betatron building.

9 I would think that the highest  
10 concentration might be the first chain men  
11 that put the ingot and the dingot up in those  
12 chains and it started swinging around, and it  
13 had to be placed in the chains might be the  
14 highest dose.

15 But the point is, we can argue  
16 about it all day long, but the idea that the  
17 highest value was in the betatron building is  
18 pure speculation. Thank you.

19 CHAIRMAN ZIEMER: Okay. Other  
20 questions for Dave?

21 MR. RAMSPOTT: Dr. Ziemer?

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1 CHAIRMAN ZIEMER: Yes. 24

2 MR. RAMSPOTT: This is John  
3 Ramspott.

4 CHAIRMAN ZIEMER: Oh, hi, John.  
5 We missed you earlier in roll call.

6 MR. RAMSPOTT: Absolutely. I'm  
7 actually in route to an animal hospital --

8 CHAIRMAN ZIEMER: Okay.

9 MR. RAMSPOTT: -- for an  
10 emergency. So everything is stable now. I  
11 can chat a minute. Dave, if I could ask a  
12 question, the quantity that you're talking  
13 about. Where did you get the quantity that  
14 you're talking about, the dust? Can I ask,  
15 where did that come from, that information?

16 MR. ALLEN: Are you talking about  
17 the quantity on the floor for the residual  
18 period?

19 MR. RAMSPOTT: Yes.

20 MR. ALLEN: Well, like I  
21 explained, we took the slug production

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1 airborne concentration that we've seen at slug<sup>29</sup>  
2 production facilities and assumed that  
3 concentration was there the whole time people  
4 could have been kicking the --

5 MR. RAMSPOTT: So are you saying  
6 you're using another site rather than GSI, and  
7 the vacuums, and all that? Is that what  
8 you're saying?

9 MR. ALLEN: For the airborne --

10 MR. RAMSPOTT: Yes.

11 MR. ALLEN: -- which then settled  
12 to the floor, yes.

13 MR. RAMSPOTT: I was curious  
14 because I heard Dr. McKeel say that if it was  
15 coming from the vacuum, you know, cleaner or  
16 what have you, that's definitely false because  
17 that thing had been emptied bazillions of  
18 times, and that other vacuum that Dr. McKeel  
19 is talking about is actually the size of a  
20 golf cart. We have pictures of it. They  
21 drove it.

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1                   So that's how big that was. ~~So~~  
2 anything that was there in a cleanup was  
3 minuscule compared to what was really there  
4 during the operation period. Okay. I'm just  
5 curious, just wanting to clarify that, and get  
6 it on the record.

7                   So it's really not from GSI. It's  
8 from another site.

9                   MR. ALLEN: Well, we did end up --

10                  MR. RAMSPOTT: Okay.

11                  MR. ALLEN: -- using the vacuum  
12 cleaner for the external dose because it was -  
13 -

14                  MR. RAMSPOTT: You are using the  
15 vacuum cleaner for external, though?

16                  MR. ALLEN: Right, because it was  
17 higher than what the external dose we  
18 calculated --

19                  MR. RAMSPOTT: Oh, well, then  
20 that's my point. That external dose from a  
21 vacuum cleaner that they inspected in 1989 had

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1 been emptied between 1966, I guess when the <sup>27</sup>  
2 uranium quit, and till '89 -- I mean till '74,  
3 at least, anyway, when GSI closed.

4 And then there were other people  
5 moved into that building, that's why  
6 everything was power-washed, actually with a  
7 fire hose, it was a little power-wash, and we  
8 actually have a worker that everybody's  
9 familiar with, his son was on that crew that  
10 actually cleaned that up with a fire hose.

11 They had to clean it up so they  
12 could remodel it to use it for storage. So  
13 same thing with the new betatron. I guess my  
14 point was: there's very, very little of  
15 anything left in that vacuum cleaner in '89  
16 for the cleanup that could have been in there  
17 during the real '53 to '66 period.

18 CHAIRMAN ZIEMER: So if you didn't  
19 have the vacuum cleaner you would have used  
20 what?

21 MR. ALLEN: I'm sorry. What?

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1 CHAIRMAN ZIEMER: In the absence<sup>28</sup>  
2 of the vacuum cleaner, what value would have  
3 been used?

4 MR. ALLEN: We would have used  
5 external dose from the surface contamination  
6 we had calculated, which is the point I was  
7 going to say was that, I somewhat agree with  
8 John. There's no guarantee the uranium or  
9 whatever radioactivity inside that vacuum  
10 cleaner, was from the Mallinckrodt uranium.

11 It could have been from other  
12 sources from natural-type of active materials  
13 that that type of site would see. But that  
14 surface contamination could get concentrated  
15 and increase the dose in a small localized  
16 area.

17 MR. RAMSPOTT: Well, I guess the  
18 point I'm getting it is: the number you're  
19 using is from an inspection in '89 and, you  
20 know, you got to empty a vacuum cleaner, so  
21 it's been emptied. So whether it's some of

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1 GSI's residual dust or it's uranium dust, the  
2 original is gone.

3 DR. ANIGSTEIN: This is Bob  
4 Anigstein. I'd just like to comment on this,  
5 but perhaps I could help clarify Dave's, if  
6 Dave doesn't mind my stepping in, because it's  
7 his area. It's just one comment on the spot.

8 What they did, I mean, it's in the  
9 report, but perhaps it needs to be  
10 highlighted. What ORNL did was they put a  
11 survey meter right flat against the vacuum  
12 cleaner. In other words, in contact with it.

13 They took the exposure rate. What NIOSH did  
14 was: they assumed that a worker was in contact  
15 with this vacuum cleaner. Now, first of all,  
16 that's way overstatement because the survey  
17 meter has an active volume of a few cubic  
18 inches.

19 The volume of a human body is much  
20 larger than that, and yet we're assuming that  
21 the entire body got that dose rate. So even

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1 if they were standing with that vacuum cleaner<sup>30</sup>  
2 pressed against the abdomen, well, possibly an  
3 organ right there would have gotten that dose  
4 rate.

5 They were assuming that every  
6 worker in that place was, basically, hugging  
7 that vacuum cleaner for eight hours a day or  
8 their whole shift, and that is a very  
9 conservative bounding estimate.

10 However, the point of this is to  
11 bound the doses and it's highly unlikely that,  
12 even if there were any other gamma sources in  
13 the plant that had been overlooked, we're not  
14 talking about going back to '52 or '53, we're  
15 going back from '66 on, when there was no more  
16 uranium being brought in, and this is what  
17 NIOSH found.

18 This was the only thing that was  
19 found, and all I can say is, it seemed like a  
20 very conservative estimate to bound the doses.

21 And I'm sure if there had been other sources

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1 around, NIOSH and SC&A would have looked at  
2 them.

3 But, you know, we do the best we  
4 can. I don't think there's any site that ever  
5 has perfect data, that ever has the kind of --  
6 in other words, if we had a time machine and  
7 could go back, say, we knew we were going to  
8 do this study and we were given adequate  
9 budget, we would have traveled back to July  
10 1st, 1966 and went around with a team of  
11 surveyors with survey meters and looking at  
12 the entire plant, along the railroad tracks,  
13 any place where plausible that uranium could  
14 have been, and we would have tried to find it.

15 But we do the best we can with  
16 what we have.

17 CHAIRMAN ZIEMER: Okay. Thank  
18 you.

19 DR. MCKEEL: Dr. Ziemer? I really  
20 would like to respond to the last couple of  
21 comments.

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1 CHAIRMAN ZIEMER: Sure. 32

2 DR. MCKEEL: My comment is that,  
3 no, the point is not to bound the dose, the  
4 point of the SEC and the residual period is to  
5 bound the dose with sufficient accuracy.  
6 That's the test, sufficient accuracy. And I  
7 would agree that the assumptions made with  
8 respect to that tiny vacuum cleaner in 1989  
9 are very conservative or claimant-favorable.

10 But my point is, it's really the  
11 larger point, that small vacuum cleaner is not  
12 representative of any plant-wide value of  
13 residual uranium at all. It's one point. One  
14 little, teeny-tiny area in the old betatron  
15 building that is separated by 100 yards from  
16 the rest of the plant complex.

17 And when Bob Anigstein says we try  
18 to do our best and no site has perfect data, I  
19 really have a problem with that kind of  
20 thinking. In an operation such as this, which  
21 is supposed to be based on good science, not

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1 only is the data not perfect at GSI, there<sup>33</sup>  
2 almost is no real measured data.

3 And I would suggest that at many,  
4 many, many sites that are on the record, the  
5 residual period is full of air breathing data,  
6 film badge monitoring data, all sorts of data,  
7 hard, measured data, that could be used to  
8 bound the dose with sufficient accuracy.

9 But to somehow say that the best  
10 we can do is sufficient, really means to me  
11 that, given any data at all, datum at all, one  
12 piece of data, a single piece of data, that  
13 NIOSH, I guess with SC&A's dissent, is willing  
14 to bound the entire residual period from 1966  
15 to 1992.

16 And the proper conclusion, the  
17 proper scientific conclusion, in my opinion,  
18 has been, from the very outset, that NIOSH  
19 lacks the data it needs to bound the dose in  
20 either the covered or the residual period with  
21 sufficient accuracy.

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1                   So, no, I don't accept. The co<sub>34</sub>  
2                   petitioner, and I'm speaking for [Identifying  
3                   information redacted], the petitioner as well,  
4                   we do not accept the idea that trying to do  
5                   our best, of course everybody tries to do  
6                   their best with the data that's available, but  
7                   the best you can do with this available data  
8                   is to conclude that it's insufficient to say  
9                   that NIOSH is able to reconstruct the dose and  
10                  bound the dose during the residual period with  
11                  sufficient accuracy. Thank you.

12                 DR. ANIGSTEIN:        I'd like to  
13                 answer.

14                 CHAIRMAN ZIEMER:    Do you have a  
15                 response, Bob?

16                 DR. ANIGSTEIN:    Let Dave go first.

17                 CHAIRMAN ZIEMER:    Yes.

18                 MR. ALLEN:        No, go ahead, Bob.

19                 DR. ANIGSTEIN:    Okay.     Actually,  
20                 what Dr. McKeel said about film badge data.  
21                 There is film badge data during the residual

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1 period because the Landauer film badge program<sup>35</sup>  
2 continued right until GSI shut down operations  
3 at the end of 1973.

4 And during the residual period,  
5 which looks over those data also, just like  
6 during the operational period, the vast  
7 majority of film badges read M for minimal,  
8 meaning less than detection limit, which is  
9 approximately 10 millirem per week.

10 So with a very small number, I  
11 have here in front of me, there were three  
12 cases during this whole period of July 1st,  
13 '66 through end of '73, where you had a large  
14 number, fair number, declining, but as their  
15 work activity declined, the number declined,  
16 but nevertheless, there were -- just doing in  
17 my head what it would be, seven and a half  
18 years times 50, so you had something like 1500  
19 weeks.

20 No, excuse me, that's wrong.  
21 Sorry. 350 weeks with anything from 30, 40,

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1 50 workers per week, badges per week, and of  
2 those, there were only six which were over  
3 100 millirem, which is where it becomes a  
4 significant weekly dose, and one of them was  
5 in error.

6 So there were no exposures. If  
7 there had been some high sources of exposures  
8 during the residual period, you know, they  
9 only count if a human being was exposed to  
10 them, and we always assume that the badged  
11 workers would be most likely the ones with the  
12 highest exposures.

13 So I think that this NIOSH  
14 assumption is a reasonable one. I mean,  
15 that's SC&A's position.

16 DR. MCKEEL: This is Dan McKeel.  
17 I have to respond to that because the record  
18 has got to be crystal clear. Yes, it's true,  
19 there was some film badge data during the  
20 residual period, and let's be clear how much  
21 that was and what that data represented.

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1                   There is Landauer film badge data<sup>37</sup>  
2                   on 108 individuals who were badged at GSI.  
3                   All of those people were men who were  
4                   radiographers who were either betatron  
5                   operators or isotope operators. The workforce  
6                   at General Steel that's included in the SEC  
7                   105 Class is at least 3000, and some of the  
8                   earlier year's newspaper reports suggest that  
9                   they were hiring and it was higher than that.

10                   So if you do that arithmetic, then  
11                   the film badges cannot be representative of  
12                   any more than 3 percent of the workforce.

13                   And if you further calculate, as I  
14                   have done in my reports several times, that  
15                   the GSI radiographers wore film badges only  
16                   part of the time, and that was while they were  
17                   in the betatron buildings, not, for example,  
18                   while they were along the whole uranium  
19                   pathway, you know, and you multiply that times  
20                   the number of hours, including the hours that  
21                   should have been monitored in those unbadged

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1 workers, as we've pointed out many times, who  
2 handled activated uranium and so forth, were  
3 exposed to the cobalt sources, exposed to the  
4 radium sources, exposed to the iridium  
5 sources, if any of those people had had  
6 badges, and they should have, then that should  
7 be figured into the person hours that we're  
8 talking about, then that 3 percent number  
9 decreases to about 0.3 percent.

10 You know, so there is a minuscule,  
11 non-representative amount of film badge data  
12 for GSI workers in only one job category, and  
13 there were hundreds of job categories at GSI  
14 and, in fact, the doses that NIOSH, and Allen,  
15 and SC&A, and Dr. Anigstein, have come up with  
16 in 2012 show a reversal.

17 In 2008, their models showed that  
18 the betatron workers got the highest doses and  
19 that the layout workers, that they say  
20 represent the rest of the workforce, had far  
21 lower doses by about a tenfold difference.

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1                   Now that ratio has been reversed<sup>39</sup>  
2 with new models, new assumptions, and compared  
3 to 2008, now the layout workers have the  
4 highest doses by far and the betatron operator  
5 doses have decreased by tenfold.

6                   CHAIRMAN ZIEMER:     We're getting  
7 out of the residual period.

8                   DR. MCKEEL:     Okay.   I'm sorry.

9                   CHAIRMAN ZIEMER:     The residual  
10 period, it's unlikely that anybody's film  
11 badge is going to show something from uranium  
12 contamination.     The uranium contamination  
13 really, as far as dose is concerned, is going  
14 to be an internal dose problem.

15                  I can't imagine any levels that  
16 you could postulate of uranium contamination,  
17 even in the worst plants we've looked at where  
18 the external dose during the residual period  
19 is going to be the driver.

20                  We've got to be looking here and  
21 the real issue on the residual period, I

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1 think, is going to be internal dose and  
2 whether or not there's reasonable assumptions  
3 on the uptakes of the contamination, and that  
4 includes the resuspension and all of those  
5 kinds of things.

6 These external doses are going to  
7 be trivial compared to that, I would think.  
8 Dave, can you comment?

9 MR. ALLEN: Well, I mean, I agree.  
10 Like I said, we calculated from our surface  
11 contamination and found very little, but we  
12 were worried about that vacuum cleaner and the  
13 idea that it could be concentrated is why I  
14 used that. And like Bob said, we --

15 DR. ANIGSTEIN: This is Bob. I'd  
16 like to comment on one thing even though it's  
17 outside today's agenda, that's about the  
18 reversal between 2008, 2012. In 2008, we  
19 calculated doses to the layout men that were  
20 actually very close. They were competitive  
21 with the doses of the betatron operator. The

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1 operator came out slightly ahead. 41

2 The reason for the change was, in  
3 that 2008, we did not have film badge data.  
4 The SC&A analysis was based on the most  
5 conservative assumptions about the radiation  
6 coming out of the betatron itself, about the  
7 shielding, about the work practices.

8 When we got to re-assess this,  
9 which we did earlier this year, the film badge  
10 data showed that the betatron workers got  
11 minimal doses. Your typical betatron worker  
12 left GSI, after however many years he was  
13 there, with minimal. Not a single film badge  
14 reading came out above M for minimal. That  
15 was a typical worker.

16 There was a minority of the  
17 workers, there were 23 film badge readings,  
18 two of which were due to the same worker, so  
19 there were 22 workers that had anything other  
20 than M, and of those 22, about half of them  
21 were given a single value of 10 millirem,

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1 which is the lowest that is ever assigned. 42

2 Anything below that goes into the  
3 M category. So we, naturally, SC&A,  
4 naturally, took this into consideration, we  
5 revised our estimate, and then we went back to  
6 the layout men because during the time, even  
7 though he might have been alternating at his  
8 job as betatron operator, but during the time  
9 he was doing the layout work, he was not  
10 carrying his badge, so we assumed that there  
11 was an eight-hour-a-day full-time layout man  
12 in the worst possible location.

13 Then, again, we got additional  
14 information --

15 CHAIRMAN ZIEMER: But you've  
16 explained that before --

17 DR. ANIGSTEIN: Okay.

18 CHAIRMAN ZIEMER: -- and that's  
19 out of the residual period.

20 DR. ANIGSTEIN: Right. Okay.

21 CHAIRMAN ZIEMER: Let's stick to

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1 the agenda here. 43

2 DR. ANIGSTEIN: Very good.

3 CHAIRMAN ZIEMER: Okay. So let's  
4 go on to your report, Bob.

5 DR. ANIGSTEIN: Okay. Well, to  
6 begin with, we've heard two reports, memos  
7 really, one, May 30th, the other one, June 8th  
8 it was released, and when I first started to  
9 review the residual period, the residual  
10 period is based on the deposition of uranium  
11 dust during the operational period.

12 So I went back and looked at the  
13 operational period, really, with a fresh eye  
14 after four years, and the first thing that  
15 caught my eye was a reference to Table 7.8, I  
16 believe it was, in the parent document, TBD-  
17 6000, which was issued in 2006 by Battelle.

18 Dave Allen made some partial  
19 revisions in 2011, so I'll refer to it as  
20 Allen 2011. The portion that I'm referring to  
21 are identical in the two documents. I just

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1 wanted to make reference to the latest<sup>4</sup>  
2 document.

3 And I'll admit, I got confused,  
4 because I was looking at the Table 7.8 and it  
5 was hard to get those numbers out of 7.8, and  
6 I jumped to the conclusion, wait a second, if  
7 I take this number during the 1950 to '55  
8 period, which is stated in picocuries per day,  
9 and calculate the breathing rate and the  
10 exposure rate, I said, gee, I come up with the  
11 same numbers as in Appendix BB in dpm per day.

12 So I jumped to the conclusion,  
13 wait a second, they forgot to convert the  
14 units. That was an incorrect assumption, but  
15 Dave Allen came back and corrected, I looked  
16 back again, and the problem was, the reference  
17 should have been to Table 7.6, which lists the  
18 198 dpm per cubic meter on which 7.8 is based,  
19 but it was a little hard to follow.

20 So going back to 7.6 it was  
21 straightforward. And actually, it had been

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1 obvious. I had found this in 2008, and over<sup>45</sup>  
2 the four years, my memory of that might have  
3 been slightly imperfect and I redid it, and,  
4 as I said, I made an error.

5 So that was the reason for  
6 changing that thing. Going on, but we still  
7 had other issues. We had the issue with the  
8 resuspension rate. Sorry, resuspension  
9 factor, make sure I use a different quantity,  
10 and we had made this observation.

11 We didn't belabor it in the  
12 review, the 2008 review, of Appendix BB  
13 because we had, at the same time, John Mauro's  
14 on the line, was the lead on reviewing the  
15 TBD-6000.

16 So rather than raise the same  
17 issue in two reports we simply said, this  
18 issue has been handled already in TBD-6000.  
19 And it remained a finding in the TBD-6000  
20 issues matrix, which was never resolved  
21 because the 1 times 10 to the minus 6th per

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1 meter remained in TBD-6000. 46

2 Dave Allen pointed out that this  
3 had been referred to, and that was correct at  
4 a slightly earlier time. Dave is just a  
5 couple of weeks behind times. That was  
6 correct that it had been referred to to the  
7 Procedures Work Group, which, Member Wanda  
8 Munn is on the phone, so she could attest to  
9 that.

10 And the Procedures Work Group  
11 found that the issue had been resolved in the  
12 latest version of OTIB-70 that was issued in  
13 March. And at the last Procedures Work Group  
14 meeting, it was decided that this is -- we  
15 thought, actually, Steve Marschke, who is our  
16 lead on reviewing procedures, was simply  
17 tasked with verifying that, in fact, it was  
18 resolved as the author, Mr. Sharfi, I believe  
19 his name is, of OTIB-70.

20 Now, OTIB-70, essentially, bounces  
21 the ball right back to the individual site

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1 review team, you know, the site Work Group,<sup>47</sup>  
2 and the NIOSH people, and the SC&A people  
3 involved for any particular site, they said it  
4 can vary and it has to be determined on a  
5 site-specific basis.

6 So given that, and as a matter of  
7 fact, at the very latest round, which is the  
8 latest review that I made, the memo of June  
9 8th, is, well, since there is some  
10 uncertainty, as always, we make the claimant-  
11 favorable assumption.

12 And, as it happened, at the Mound  
13 site, NIOSH had agreed to use, for the  
14 inhalation of stable tritides, meaning  
15 chemically stable tritium metal compounds,  
16 they had decided to assign it 5 times 10 to  
17 the minus 5 as being a conservative upper  
18 bound.

19 It's not the highest number  
20 mentioned in OTIB-70. There are tables and  
21 reviews of the literature which go as high as

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1 10 to the minus 2, but it's on the high end<sup>48</sup>  
2 It was the one that was used by NRC at one  
3 point in a document called NUREG/CR-5512  
4 Volume 3, senior author was Beyeler, and they  
5 had proposed 5 times 10 to the minus 5.

6 NRC took another look at it. CR  
7 stands for contractor, so this was a  
8 contractor report. NRC issued its own report,  
9 which is NUREG-1720, so if you don't see the  
10 CR, that NUREG means that it's a staff report,  
11 even though sometimes it's written with  
12 contractor help, but it means that the NRC  
13 stands behind it.

14 And that one said 10 to the minus  
15 6th, but that's only for a facility that has  
16 undergone cleanup. So all the easily  
17 removable contamination was removed. It had  
18 been swept, scrubbed, washed. If they wanted  
19 to remove all contamination they would have  
20 simply chipped away the concrete. It doesn't  
21 require it, but it's something that has been

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1 cleaned up, and also, it's a quiet area,  
2 Nobody is stomping around, driving trucks over  
3 it, raising up dust. So during a quiescent  
4 stage, 10 to the minus 6 is a good number for  
5 a decommissioned facility.

6 So this would not apply to GSI. I  
7 mean, there may have been some washing, but we  
8 don't accept the fact that it was, certainly  
9 during the operational period, that this would  
10 be good. So the latest thing, which is  
11 actually an update from my earlier memo of May  
12 30th, because I hadn't looked at the OTIB, I  
13 wasn't aware of the Mound -- the precedent  
14 that was set by NIOSH.

15 So to be consistent and  
16 conservative I would say 5 times 10 to the  
17 minus 5. I mean, we're just throwing it on  
18 the table. We're not taking a rigid position  
19 on this, but we're just throwing it on the  
20 table that this might be a good number to use  
21 for resuspension.

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1                   So resuspension would affect the <sup>50</sup>  
2 residual period. It would also affect the  
3 exposure of workers in between betatron  
4 operations. Now, I'll go back and underline  
5 and italicize that, in between betatron  
6 operations.

7                   During betatron operations, we  
8 agreed that the 198 dpm per cubic meter is a  
9 reasonable upper bound. This was actually  
10 measured during actual operation where there  
11 was more disturbance than would be true at  
12 GSI.

13                   And also, I want to clarify and  
14 answer to a couple of Dr. McKeel's points  
15 about the uranium being moved throughout the  
16 plant. Sure, we recognize that, but this is a  
17 gigantic plant. I forget how many acres it  
18 was, and ten cleaning and finishing buildings,  
19 and a large number of other buildings.

20                   The NIOSH analysis assumed that  
21 that 198 dpm per cubic meter prevailed

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1 throughout the entire plant during the hours<sup>51</sup>  
2 that uranium was handled.

3 Now, the uranium was not being  
4 handled in every building, even if it came in  
5 on the railway, as I recognize, and was  
6 handled on the loading dock, locally, you  
7 could have had some here, some there, some  
8 further down, it would not have been  
9 everywhere all at once.

10 So consequently, this, again,  
11 seemed like a conservative, claimant-favorable  
12 assumption. Now, as far as the hours, we do  
13 have an issue with that because the simple  
14 picture of half and half, half an hour for  
15 setup, half an hour for takedown, one hour for  
16 the shot.

17 First of all, that would not be  
18 the case even with the idea of a slice, which  
19 as I admit, most likely, it's not the only  
20 shape that was radiographed, but even with the  
21 slice, it would have required several shots.

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1 So it would not be half an hour in-between<sup>52</sup>  
2 each shot.

3 Also, some of the shots were  
4 shorter. There is a record of small-diameter  
5 rods at Weldon Spring being radiographed  
6 somewhere. And the somewhere, we'll assume,  
7 is GSI because I'm not aware of any other  
8 radiographic facilities for uranium in that  
9 area, so it might have very well been.

10 So the fraction of time inside the  
11 control room and inside the shooting room is  
12 variable. It's an uncertain number and I  
13 would suggest that we simply take the  
14 conservative approach and just say, if they  
15 worked 500 hours a year, just assume that that  
16 was for uranium handling, because the time  
17 spent by, say, the chain men loading it onto  
18 the railroad car, the little electric railcar  
19 inside the plant, may not have been figured.  
20 This may not have been.

21 When GSI billed Mallinckrodt, they

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1 may very well not have included the time spent<sup>53</sup>  
2 by the betatron team in setting up the shot,  
3 shooting it, and getting it out of the  
4 betatron building. My guess is they probably,  
5 Mallinckrodt and AEC may have raised an  
6 eyebrow and said, wait a second, you're  
7 charging us \$16 an hour for simply  
8 transporting it from one place to another?

9           So it may not have included that,  
10 but it was probably not that much time. So if  
11 you make this other assumption that no time  
12 was spent in the control room, that would seem  
13 to offset any time outside the betatron  
14 building where the uranium might have been  
15 handled, not just sitting, but just handled,  
16 so that there was some disturbance.

17           So we think that if they simply  
18 eliminate the factor of 2, we will be  
19 comfortable with the rest of that. And let me  
20 just take another glance. I think that sums  
21 up the -- oh, yes, and the hours themselves,

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1 we would even go slightly -- I just made the <sup>54</sup>  
2 argument that maybe it should have been 500  
3 for the early years, 500 hours or 450, when  
4 rethinking it, why not just -- since we don't  
5 know, really, what was going on during that  
6 time.

7 In other words, we have the '53 to  
8 the first quarter of '58, but let's just say a  
9 round number, '53 through '57, so that's five  
10 years, where we don't have firm information on  
11 the hours, and then we have '58 through '66,  
12 which is eight years, eight and a quarter,  
13 where we do have detailed data.

14 So 8 out of 13 years is a good  
15 sample and I would take the highest of those  
16 years, not the first, but just going back  
17 over, take the highest, because that's what we  
18 do with a lot of other data.

19 If you do a co-worker, we say,  
20 well, don't know what this person got because  
21 he was not monitored, but other workers were

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1 monitored, and a conservative value would be<sup>53</sup>  
2 let's just say he got the highest dose of all  
3 the monitored workers.

4 It's unlikely that he would have  
5 gotten higher. That's the same thing I would  
6 say here. For those five years, give it the  
7 highest number of hours of any year covered by  
8 those purchase orders. And again, the  
9 increase is not huge. It goes from something  
10 like 337 hours to 437 hours a year, if I  
11 remember correctly.

12 So with those modifications or  
13 suggestions, we think that the internal dose  
14 analysis, both for the operational period and  
15 for the residual period, is reasonable,  
16 claimant-favorable, and sufficiently bounding.

17 So that's basically our position.

18 CHAIRMAN ZIEMER: Okay.

19 DR. ANIGSTEIN: John Mauro, do you  
20 have anything to add on this?

21 DR. MAURO: No, you did a

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1 wonderful job, Bob. Thank you. 56

2 DR. ANIGSTEIN: Thank you.

3 DR. MAURO: I think you covered  
4 everything we've been working on and talking  
5 about.

6 CHAIRMAN ZIEMER: Any questions,  
7 Work Group Members, for Bob? Or others have  
8 questions? Okay. Then we want to hear from  
9 Dr. McKeel. You have his document of June 1st  
10 and, Dr. McKeel, if you would, to focus, I  
11 think the issues relating to sort of NIOSH  
12 procedures, and tasking, and so on, I don't  
13 want us to get into that here.

14 I think that's something you will  
15 work with Ted on, but can we focus on your  
16 technical issues?

17 DR. MCKEEL: Yes, sir. This is  
18 Dan McKeel, can you hear me all right?

19 CHAIRMAN ZIEMER: Sure.

20 DR. MCKEEL: Okay. I'm going to  
21 focus entirely on the residual period. The

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1 first comment I'd like to make is that, when<sup>57</sup>  
2 you reviewed the papers that I had submitted.

3 On 6/13, I submitted a four-page response to  
4 the Allen June 8th, 2012 memo, and I sent that  
5 to everybody in the Work Group; all the Work  
6 Group Members; Doctors Anigstein and Mauro,  
7 and also sent it to Dr. Neton and to David  
8 Allen.

9 So that comment needs to be  
10 entered on the record and it was sent --

11 CHAIRMAN ZIEMER: Oh, thank you.  
12 Great.

13 DR. MCKEEL: Okay.

14 CHAIRMAN ZIEMER: And the date on  
15 that was?

16 DR. MCKEEL: 6/13.

17 CHAIRMAN ZIEMER: 13?

18 DR. MCKEEL: Yes.

19 CHAIRMAN ZIEMER: June?

20 DR. MCKEEL: Right. Let's see.

21 So the next point I'd like to make is, since

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1 we were just finishing with the SC&A<sup>58</sup>  
2 presentation, while I have it front of me  
3 here, on the very last page, on Page 3 of this  
4 June 11th SC&A memo, it states that in Allen  
5 6/08, it stated that all new GSI assessments  
6 would be based on 3250 hours, so that was no  
7 longer an issue.

8 Well, I think the issue is that  
9 everyone has agreed on the 3250 hours, and I'm  
10 talking about SC&A and NIOSH, since the  
11 October 2007 meeting when that number was  
12 established, and it has not been incorporated  
13 into a revision of Appendix BB.

14 So although everybody may agree  
15 with it, and may use it in calculations and  
16 technical papers, as far as being incorporated  
17 into Appendix BB, that hasn't taken place.

18 CHAIRMAN ZIEMER: Right. The Work  
19 Group has also approved that and we're  
20 certainly aware of -- it's sort of an internal  
21 NIOSH thing as to when the revision will

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1 occur. So, yes, I understand the frustration<sup>59</sup>  
2 there, Dan, but go ahead.

3 DR. MCKEEL: Well, as I said  
4 before, it's not a matter of frustration, it's  
5 a matter of --

6 CHAIRMAN ZIEMER: Well, I think it  
7 is.

8 DR. MCKEEL: The fact is, Dr.  
9 Ziemer, that NIOSH wrote to me and said the  
10 reason that they had not revised Appendix BB  
11 by now is because they were waiting, and I  
12 presume still are waiting, this was from  
13 Stuart Hinnefeld, the Director of DCAS, that  
14 they were waiting for the Work Group to  
15 conclude its deliberations on Appendix BB  
16 issues.

17 CHAIRMAN ZIEMER: Right.

18 DR. MCKEEL: And those still  
19 haven't been clarified. And in fact, Ted Katz  
20 wrote me recently that there probably would be  
21 a meeting about resolving those, but that

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1 meeting hasn't yet been scheduled. So anyway,  
2 moving on.

3 The next thing I want to talk  
4 about is the Brownfield letters that are  
5 mentioned by David Allen in his 6/08  
6 memorandum. And the Brownfield letters refer  
7 to a payment that GSI is making for \$48 to  
8 Mallinckrodt Weldon Springs.

9 And the idea that both NIOSH and  
10 SC&A seem to accept, or at least they didn't  
11 question in their reports, is that that  
12 purchase order refers to uranium. Well, the  
13 letters themselves don't say anything about  
14 uranium.

15 And what John Ramspott and I want  
16 to point out to you is that, there is, on  
17 record, a purchase order that Mallinckrodt  
18 uranium division issued to General Steel  
19 Industries for a piston rod and that would be  
20 a purchase order that they called U-83621-F,  
21 and that can be found on Page 30 of the FUSRAP

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1 IL.28-5 report on GSI. 61

2 And that's the major report that  
3 contains all the purchase orders. So the  
4 Brownfield letters that Dave Allen refers to  
5 are on Pages 17 and 21 of that document, and  
6 the piston rod purchase order is on Page 30.

7 So Mr. Ramspott and I would  
8 suggest that those two letters by Brownfield,  
9 which really don't figure in the calculations,  
10 and should not, under any circumstances, be  
11 construed as any evidence that NIOSH has more  
12 data on GSI uranium shipments from  
13 Mallinckrodt prior to the first purchase order  
14 in 1958; they don't. And those letters should  
15 not be used as any kind of proof of that fact.

16 Okay. The second thing I want to  
17 talk about is just to remind everyone that,  
18 when we're talking about the TBD-6000, the  
19 parent document, and the slug production  
20 facility, that this is surrogate data that has  
21 to be used because there is no uranium,

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1 surficial or surface, surveys before the 1989<sup>02</sup>  
2 ORNL survey, which we've talked about this  
3 morning.

4 The second this is that, ORNL, in  
5 1989, in their reports, provides no  
6 justifications why it limited its surveys to  
7 only the two GSI betatron facilities. So  
8 except for postulating that might have been a  
9 cost-saving measure, we don't know about that.

10 The third thing I'd like to say is  
11 that, both the Board and NIOSH have developed  
12 discrete surrogate data criteria by which they  
13 judge the use, and appropriateness of use, of  
14 surrogate data from one site being applied to  
15 another site.

16 And in my comments, including the  
17 one from yesterday and the previous one, I  
18 pointed out, and previously, that there has  
19 been no justification that the slug facility  
20 was similar enough to GSI to make that a valid  
21 source of surrogate data.

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1                   And in fact, Dave Allen outlined<sup>63</sup>  
2 many differences in even the type of source  
3 term, that is that the slugs were smaller,  
4 they had been cleaned of their crust and their  
5 magnesium fluoride crust, with its  
6 concentration of contaminate radionuclides, so  
7 the source terms were different and what was  
8 done with the source terms was different.

9                   So the uranium at GSI, of course,  
10 was bombarded with 24/25 MeV betatron, which  
11 not only activated it, but also, as we've  
12 demonstrated through published peer-reviewed  
13 literature, actually caused fission, at very  
14 low levels, but caused fission of up to 1 or 2  
15 percent of the uranium molecules.

16                   So I just don't think those two  
17 facilities are comparable at all and I want to  
18 put on the record that we do, the petitioners,  
19 object to using the slug facility as surrogate  
20 data.

21                   We've already talked about the

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1 uranium route at GSI and I guess the surrogate<sup>64</sup>  
2 data issue is the one that I would point to  
3 about this. I understand that the slug  
4 facility airborne uranium concentration, the  
5 air concentration, that's what's used for all  
6 the plant at GSI. I appreciate that fact.

7 But the point is, this blind  
8 acceptance that a value from a completely  
9 different facility, with lots of data, can  
10 just be, by fiat, applied to GSI, and that  
11 that is a sufficiently accurate bounding, and  
12 that it's a claimant favorable one. You don't  
13 know that.

14 And again, I point out, you can do  
15 all the reasoning you want to, all the  
16 calculations you want to, all the modeling  
17 with computer code that you want to, but you  
18 don't actually know what the airborne  
19 concentration of uranium was at General Steel  
20 Industries at any time from 1952 through 1992.

21 So that's all I really want to say on that

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1 point.

65

2 The fifth point I want to bring up  
3 is that, we have now had very good and  
4 thorough explanations of why SC&A believes  
5 that the resuspension factor used in TIB-70 is  
6 inappropriately low by a factor of about  
7 twofold for GSI.

8 And I just want to say that the  
9 petitioners agree with that sort of reasoning  
10 and believe that a higher resuspension factor  
11 should, in fact, be used for GSI. So I think  
12 that's an issue that needs to be resolved by  
13 the Work Group and by the full Board.

14 The other comment I want to make  
15 is that, on the last page of the first SC&A  
16 response to Dave Allen, not to Dave Allen, but  
17 just on the first reviewed memo of May 30th  
18 that SC&A wrote about this topic.

19 They mention the formula developed  
20 by Sharfi and the Procedures Review  
21 Subcommittee, and they mention that this

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1 formula could be used to calculate the <sup>66</sup>  
2 midpoint of the uranium levels in the air  
3 during the residual period, and that, based on  
4 that, you could provide a uranium amount in  
5 the air for each year of the residual period.

6 So again, this is a house of cards  
7 built on a house of cards. It's taking an  
8 assumption from two surrogate document  
9 sources, TBD-6000 and TIB-70, and coming up  
10 with a derivative formula that allows you to  
11 make a calculation of data that didn't, in  
12 reality, exist at all.

13 And, you know, there are recent  
14 analogies to that, I believe, in the financial  
15 world. And anyway, I think it's wrong,  
16 scientifically, and I hope the Work Group will  
17 reject that type of reasoning.

18 The final thing I want to say is  
19 about the last point that was discussed by Dr.  
20 Anigstein. We've talked about the use of the  
21 3250 hours, but that number, you know, is more

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1 solid because it's backed up by worker<sup>67</sup>  
2 testimony.

3 There's a lot of hours calculation  
4 that are made at GSI based solely on the  
5 presence of purchase orders from Mallinckrodt  
6 uranium division. And the point that has  
7 always struck me about those purchase orders  
8 is that, in and of themselves, they really  
9 don't prove anything about uranium actual  
10 usage at GSI.

11 They are a purchase order.  
12 There's no confirming receipt that GSI  
13 received that amount of uranium from  
14 Mallinckrodt. There's no receipts from  
15 Mallinckrodt that GSI ever returned a given  
16 amount of uranium to them. There are no shot  
17 records of the betatron shot records, which we  
18 know existed, by which you could gauge all  
19 that.

20 So, you know, I think that also --  
21 and it does reflect on the uranium mass, the

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1 source term itself, that was present during  
2 the residual period. If we don't know, with  
3 sufficient accuracy, the source term for  
4 uranium that existed at GSI during the  
5 operational period, how could we possibly  
6 accurately know the source term mass during  
7 the residual period? And I suggest we can't  
8 do that.

9 So I guess that concludes my  
10 thing. I really appreciate the opportunity to  
11 address the Work Group one more time and I'll  
12 be interested in the further deliberations for  
13 the afternoon. Thank you very much.

14 CHAIRMAN ZIEMER: Okay. Thank  
15 you, Dan. Questions for Dr. McKeel.

16 DR. ANIGSTEIN: Yes. This is Bob.  
17 Three comments. One is about the Brownfield  
18 memo, which is really the same memo that was  
19 sent out twice, once in February and I think  
20 once in June, or later in the year, in the  
21 latest SC&A memo of June 8, we do make the

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1 statement that we don't think that this is 69  
2 we didn't question that it was tied uranium,  
3 we just said, it does not cast any light on  
4 the usage on the monthly hours.

5 So I think that's a non-issue and  
6 NIOSH also did not also explicitly base its  
7 hours on that. It simply said that, maybe the  
8 hours were less.

9 As far as the purchase orders,  
10 these are limits. These are legal limits that  
11 said, you will not bill us any more than. The  
12 earlier ones where I said this is the  
13 estimated amount, the later one, in later  
14 years, they said, this is the limit. We're  
15 not authorizing you to do any work to exceed  
16 these purchase orders.

17 And being a commercial entity,  
18 there's no reason they would have done more  
19 work than they were being paid to do.

20 DR. MCKEEL: Dr. Anigstein?

21 DR. ANIGSTEIN: Yes.

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1 DR. MCKEEL: How can you be  
2 positive that the purchase orders that exist  
3 now are all of the purchase orders that were  
4 issued? And I suggest you can't possibly know  
5 that.

6 DR. ANIGSTEIN: They are  
7 continuous. Starting with March 1958 going  
8 through June 30th, 1966, they are continuous.

9 DR. MCKEEL: I understand that,  
10 but how do you know there were not purchase  
11 orders before 1958 that we don't know about?

12 DR. ANIGSTEIN: Oh, no, of course.  
13 That's the whole point. NIOSH and SC&A agree  
14 that, prior to 1958, there was some uranium  
15 work being done. The only documentary  
16 evidence, besides the Brownfield memo, the  
17 February, which is just prior to the first  
18 purchase order that we have on record, there  
19 is only the cryptic one-liner, which is  
20 apparently a cover sheet to some other  
21 documents, which no longer exist, and it says,

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1 and I'm going by memory now, regarding General<sup>71</sup>  
2 Steel, or General Steel Castings, uranium  
3 ingots, something about X-rays of uranium  
4 ingots done by General Steel Castings.

5 And it's dated December 1953. And  
6 apparently, it's a cover sheet to a file,  
7 which doesn't exist, so that's the only  
8 evidence that work was done prior to -- you  
9 know, going back as far as 1953. And the DOE  
10 finding as part of the FUSRAP program, long  
11 before the current EEOICPA was even thought  
12 of, said that it may have started as early as  
13 1953.

14 And also, just to go on record, in  
15 answer to something else Dr. McKeel's longer  
16 submission a little earlier that I believe he  
17 refers to as the 11-pager, we also made the  
18 observation that the work may have started as  
19 early as 1952. It couldn't have started any  
20 earlier because they didn't have a betatron.

21 But early in 1952, I found a short

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1 notice in the New York Times, obviously based  
2 on, probably, a publicity release from General  
3 Steel, saying that this 24 MeV betatron has  
4 been installed by the Army in Granite City in  
5 January '52.

6 So our position has always been  
7 that '52 should be included, but since it is  
8 not up to NIOSH or the Work Group to make this  
9 determination, DOL has not acted on that, but  
10 that, you know, is one of the issues we raised  
11 in our comments on Appendix BB.

12 And if I can just finish up, the  
13 last comment Dr. McKeel raised about we don't  
14 know the mass of uranium. Well, true, they  
15 don't know the tonnage of the uranium ingots,  
16 but none of the analysis uses that  
17 information. It's not needed.

18 We simply say there was enough  
19 uranium to give us this concentration of a 198  
20 dpm per cubic meter, because that's the  
21 highest that was recorded for this type of

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1 operation. And the volume of the uranium ~~is~~<sup>73</sup>  
2 not what's at issue. It's how much  
3 disturbance is going on.

4 DR. MCKEEL: Dr. Anigstein.

5 DR. ANIGSTEIN: Yes.

6 DR. MCKEEL: You're replying to my  
7 comments and I've got to reply to yours.

8 DR. ANIGSTEIN: Excuse me? I have  
9 to reply to your comments.

10 DR. ANIGSTEIN: Sure.

11 DR. MCKEEL: Once again, let's  
12 take it in reverse order. No, what I'm saying  
13 is that, the slug facility, the surrogate  
14 data, where you get the 198 figure, is not  
15 based on GSI data at all.

16 DR. ANIGSTEIN: I agree.

17 DR. MCKEEL: It's based on data  
18 from another place --

19 DR. ANIGSTEIN: Correct.

20 DR. MCKEEL: -- that has not been  
21 shown to be similar enough, I think, to GSI.

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1 And the second thing is, when I asked Dave  
2 Allen about the Brownfield memos, he told me  
3 that, certainly, SC&A knew about those in 2008  
4 and pointed me to a November the 10th, 2008  
5 Work Group meeting where, on Page 103, you, in  
6 fact, did allude to two letters that talked  
7 about shipments with Mallinckrodt that were  
8 before the advent of the purchase orders, but  
9 that's all you said.

10 You didn't say anything about what  
11 they were, or what the source was, or where  
12 they were from --

13 DR. ANIGSTEIN: Yes, but in my  
14 June 8th memo I specifically discussed the  
15 Brownfield memos.

16 DR. MCKEEL: Yes, I understand  
17 that.

18 DR. ANIGSTEIN: Okay.

19 DR. MCKEEL: But I'm talking about  
20 what Dave Allen told me. And then he also  
21 said that I knew about them in 2008 because my

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1 name showed up on Page 104 of that same  
2 transcript, so I got the transcript and read,  
3 and actually, what I said on Page 104 and Page  
4 105 amplifies what you just said about the New  
5 York Times article showing that the Army  
6 actually installed the betatron January 1,  
7 1952.

8 And what I put on the record was  
9 that John Ramspott and I went over to the  
10 Missouri Historical Society, got the GSI Board  
11 minutes for 1952, '52, and it's quite clear in  
12 there that, not only did they have on record  
13 that the government built and tried to give to  
14 them the betatron, the betatron facility, and  
15 several other facilities at General Steel  
16 Industries, and that the Board, later in 1952,  
17 actually turned down the offer to accept those  
18 as a gift and take care of them.

19 So I think there are two good  
20 pieces of evidence that there was a betatron  
21 installed at GSI and I think it's a very

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1 reasonable comment of yours and I think, 76  
2 actually, it should actually be persuasive to  
3 the Department of Energy that, maybe, the  
4 uranium operation started in 1952 rather than  
5 1953, but that's an issue for another time.

6 And anyway, I think I would just  
7 make my final comment that the purchase  
8 orders, I agree with you, they are continuous  
9 from the first one in '58 through '66,  
10 however, my comment about the lack of  
11 corroborative evidence that those amounts were  
12 actually shipped; maybe the mass term is  
13 lower.

14 But I'm just saying that, in and  
15 of themselves, all they are is a statement of  
16 what could be done. And I think we've all  
17 been in industry long enough that we know  
18 perfectly well that, purchase orders get  
19 modified at the last minute, a note, or a  
20 call, is made that's not recorded on paper,  
21 and that, sometimes, purchase orders are

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1 changed.

77

2 And particularly, in an area like  
3 uranium production for nuclear production  
4 during the 1950s and 1960s, the requirements  
5 of the AEC and Mallinckrodt for that kind of  
6 work, I'm sure, was shifting all during that  
7 period.

8 So I just would say that purchase  
9 orders are a valuable resources, but they're  
10 not the total picture. Thank you very much.

11 DR. ANIGSTEIN: If I can just make  
12 a minor comment on this. As an employee of a  
13 government contractor, and being a project  
14 manager on other contracts, I can say, you  
15 don't bill the government for anything that  
16 you're not authorized to bill.

17 If we found that we got a contract  
18 for X number of work hours, X number of  
19 dollars, during a given year, whoops, we found  
20 that the work is going to take more time, each  
21 and every time we would have our contracts

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1 manager write a letter to the relevant  
2 government agency's contract manager, contract  
3 officer, and say, you know, we request an  
4 amendment of our contract due to the following  
5 reasons, and this how much more.

6 And usually, they would agree, and  
7 we would get a new and amended contract,  
8 Amendment Number 2, Amendment Number 3,  
9 Amendment Number 4, to the contract as  
10 necessary before we could bill a single penny  
11 in excess of the authorized amount.

12 So those purchase orders, it could  
13 not have been done by a verbal because  
14 Mallinckrodt was working for the government.  
15 They were not going to pay GSI unless the  
16 government paid them. And they would need a  
17 paper trail. So it's highly unlikely that  
18 such a thing would have taken place without a  
19 paper trail.

20 MR. RAMSPOTT: Dr. Ziemer?

21 CHAIRMAN ZIEMER: Yes. Comments?

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1 MEMBER BEACH: Paul, this is  
2 Josie.

3 CHAIRMAN ZIEMER: Yes, Josie, go  
4 ahead and then John Ramspott.

5 MEMBER BEACH: Okay. Sorry to cut  
6 in on you, John, I want to make two points, or  
7 ask two questions, basically, the first one is  
8 on the surrogate data issue. We haven't heard  
9 from SC&A about the comparison between the  
10 Board criteria on surrogate data, so I'm  
11 interested to hear SC&A's take on that.

12 And then the other one is for  
13 NIOSH, the resuspension factor being too low.

14 On Page 3 of your report you say, in Bullet  
15 2, that this should go back to the Procedures  
16 Work Group and the Procedures Work Group sends  
17 it back to our Work Group, so I want to hear a  
18 little bit more about that.

19 DR. ANIGSTEIN: John, would you  
20 answer that? The first part.

21 DR. MAURO: Yes, perhaps I could

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1 weigh in. This is John Mauro. Josie, you're  
2 correct. Very often, when surrogate data has  
3 been used, especially at these AWE facilities,  
4 we usually have a separate section that says,  
5 okay, let's review the surrogate data and how  
6 it was used against a five-board criteria. We  
7 have not done that.

8 MEMBER BEACH: Okay. I would like  
9 to see something like that done, Paul.

10 DR. NETON: Paul, this is Jim  
11 Neton, I think the TBD-6000 was reviewed and  
12 approved for use as surrogate data. I mean,  
13 it's a little different here because it's  
14 based on multiple sites. It's not just a  
15 single abstraction from, like, one facility to  
16 another.

17 CHAIRMAN ZIEMER: Right. TBD-  
18 6000, the findings matrix on TBD-6000 has been  
19 completed and those issues are closed, and  
20 you're right, this is not a single site that  
21 TBD-6000 is based on. There's kind of a

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1 compilation of sites, and I don't recall off<sup>81</sup>  
2 the top of my head what all they were, Jim.  
3 Do you recall?

4 DR. NETON: I can't recall off the  
5 top of my head, but it was several different  
6 documents that were written in the early years  
7 of AEC operations.

8 CHAIRMAN ZIEMER: Yes. But I  
9 think in certain sense, we've assumed that the  
10 appendices under that are appropriate, but  
11 explicitly, I don't think we have established,  
12 and I think Dr. McKeel's question is certainly  
13 a valid one that, you have to, in essence,  
14 establish that the parent document is an  
15 appropriate surrogate for the appendices for  
16 which it's being used.

17 Keep in mind that a lot of these  
18 things occurred, sort of, concurrently, the  
19 surrogate data criteria were being developed,  
20 sort of, at the same time as some of these  
21 others. And so we have sites that were

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1 handled in the absence of explicit surrogate  
2 data approaches and we have others that the  
3 surrogate data criteria were specifically  
4 addressed as part of the analysis.

5 I'm quite certain that we haven't  
6 done a surrogate data analysis for GSI  
7 relative the parent document.

8 MEMBER MUNN: This is Wanda. I  
9 have to comment that we have had a great deal  
10 of discussion with respect to the impression  
11 that there is something truly mysterious about  
12 uranium metal, that there are many things that  
13 are unknown about uranium metal.

14 This bears on the surrogate data  
15 issue. Uranium metal has been very thoroughly  
16 handled, very thoroughly studied, and very  
17 thoroughly analyzed over the last, almost, a  
18 100 years. And we certainly do know a great  
19 deal about uranium and what its  
20 characteristics are, both physically and  
21 chemically.

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1                   There's nothing very mysterious<sup>83</sup>  
2                   about the uranium that is in question at GSI.  
3                   That's not really in question. It's known  
4                   what it is. Therefore, when we assert that  
5                   there is something unusual about the  
6                   "surrogate data" here, we're not really posing  
7                   a question that is a valid one, simply  
8                   because, this is not the kind of surrogate  
9                   data issue that we normally address.

10                   This is a simple straightforward  
11                   issue with respect to what can be anticipated,  
12                   what can be shown, to be exposures that can be  
13                   gained from a known metal over a known period  
14                   of time, and that's what's been done here.

15                   There's nothing very mysterious  
16                   about uranium. We know uranium as we know how  
17                   it behaves. We know what its source term is.

18                   DR. MCKEEL: Dr. Ziemer, this is  
19                   Dan McKeel. May I comment, please?

20                   CHAIRMAN ZIEMER: Sure.

21                   DR. MCKEEL: Well, to Wanda Munn's

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1 comment. I would disagree. I think there is  
2 a lot known about uranium metal, and actually,  
3 I have labored hard to get into the record  
4 that we have not addressed the Work Group,  
5 SC&A and NIOSH, have not addressed some of the  
6 key issues that really have to be researched  
7 and documented in order to know exactly what  
8 uranium came over to Mallinckrodt from both  
9 the Weldon Spring site and from the  
10 Mallinckrodt Destrehan Street site.

11 There is even a question about the  
12 mix of uranium that came over as ingots; as  
13 dingots. Ingots and dingots, by the way, if  
14 you look at the total chemical composition of  
15 the uranium plus the outer crust, it's  
16 different between those two.

17 And for Dave Allen to say the main  
18 form of uranium that was deposited on the  
19 surfaces was oxides, may not be true. I am  
20 sure that those chains rubbed off some of the  
21 magnesium fluoride crust with its contaminant

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1 radionuclides. 85

2 Mallinckrodt and Weldon Spring,  
3 and all the other uranium production  
4 facilities, went to great lengths and did many  
5 experiments, that are documented in technical  
6 reports, to get the uranium content as pure as  
7 possible, but no matter how hard they tried,  
8 that's not possible.

9 You know, and there were trace  
10 contaminants that matter. Now, in a pure,  
11 fresh uranium metal ingot, you know, we know a  
12 lot about it. But then you have to know how  
13 old that was to know how those daughter  
14 products factored in and so forth.

15 And you can take two views. One  
16 is, you can say, all of that is unimportant  
17 and insignificant, but to say that we know  
18 all, everything, about the uranium from the  
19 Mallinckrodt Uranium Division to GSI, is  
20 simply not square with the facts.

21 There's evidence that they used

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1 some recycled uranium, and that's even<sup>86</sup>  
2 acknowledged in the NIOSH technical reports.

3 MEMBER MUNN: And no one has ever  
4 said that any of the exposures were  
5 insignificant. What I said was that they can  
6 be -- what I inferred was, that they could be  
7 bounded. We know enough about the metal to  
8 know that we can bound them and we can bound  
9 them with a good degree of scientific  
10 accuracy.

11 That's what NIOSH has gone out of  
12 their way to attempt to do and has, in fact,  
13 done with respect to the folks who worked at  
14 GSI.

15 DR. MCKEEL: Well, you get to make  
16 the recommendation, and I respect that that's  
17 your opinion, and, you know, I tried to put on  
18 the record why I do not think that's an  
19 accurate assessment, but that's where I think  
20 it needs to rest.

21 What the statement that you said

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1 is that, the physical and chemical composition<sup>87</sup>  
2 of the uranium sent to GSI was not in  
3 question, we know what it is. And I'm saying,  
4 it is in question, and you don't know what it  
5 is, and Mr. Thayer, who's the head of  
6 Mallinckrodt, has a table, that John Ramspott  
7 sent you, about the composition of some of  
8 their uranium products.

9 And the composition of it,  
10 chemically, changes from run to run, from  
11 ingot to ingot.

12 MEMBER MUNN: To clarify --

13 DR. MCKEEL: And I understand what  
14 you say that there are no significant  
15 differences, but the truth of the matter is  
16 that, if you looked at the universe of metal  
17 products in any one Class, let's say, ingots,  
18 or more to the point, let's say dingots, the  
19 direct ingot process, and you actually had a  
20 table of all the chemical compositions of each  
21 and every dingot that Mallinckrodt produced,

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1 I'm sure you'd find differences. 88

2 You might say they're small, but  
3 I'll bet you there would differences in  
4 measured radioactivity, let's say, of a  
5 counter placed 1 inch away from the surface of  
6 the dingots. So, you know, I've seen that in  
7 many technical reports.

8 So to say that we have sufficient  
9 information, I guess that comes down to your  
10 definition of what is sufficient accuracy.  
11 And my overall comment that I'm going to make  
12 to the Board six days from now is that, it's  
13 amazing to me, and it is true, that the  
14 definition of sufficient accuracy is still  
15 being established, that NIOSH is charged, as  
16 one of its recommendations under the ten-year  
17 review, to further define sufficient accuracy.

18 So, you know, at the moment,  
19 that's a definition, operational, it's an  
20 operational definition, and it certainly  
21 varies among individual observers.

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1                   And then the final comment I have  
2                   to make is, I'm not clear, from what the  
3                   discussion was, but what is the answer to  
4                   Josie Beach's request? And that was that she  
5                   would like to know how the surrogate data  
6                   criteria apply to GSI and the slug facility,  
7                   and I would too.

8                   And I don't think it's clear what  
9                   the Work Group is going to do about that.  
10                  Thank you.

11                  MEMBER MUNN: I wanted to clarify  
12                  on one statement. Yes, there are, in fact,  
13                  differences from ingot to ingot which can be  
14                  identified with finely-tuned instruments.  
15                  That does not change the fact that enough is  
16                  known about the activities, and the about the  
17                  type of metals that we're dealing with, to be  
18                  able to sufficiently bound them, and that is  
19                  my point. The only point I wanted to make.

20                  DR. MCKEEL: Well, this is Dan  
21                  McKeel, I have to make one final comment.

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1 There is well-documented AEC technical reports<sup>90</sup>  
2 from Weldon Spring that show that they were  
3 alloying uranium with various alloys, uranium  
4 dingots now, that they were alloying them with  
5 various trace components.

6 And the point of this was to  
7 stabilize those dingots as uranium fuel  
8 elements in the Hanford reactors where you  
9 work. And they did that for several years.  
10 They tinkered with the composition and then,  
11 finally, they decided that the tinkering  
12 really hadn't resulted in a more stable  
13 product, so they went back to a more baseline  
14 configuration.

15 So I'm saying that, even during a  
16 two or three-year period, the basic structure  
17 of dingots changed. They made experimental  
18 dingots and some of those, undoubtedly, found  
19 their way over to GSI, although, that  
20 information is not very well documented on the  
21 record we have available to us.

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1                   But the fact that those  
2 experiments were going on, and those  
3 manipulations were taking place at Weldon  
4 Spring, is very well documented. So I really  
5 need to be quiet about this, but when comments  
6 like that are made I just must respond to  
7 them. So thank you very much.

8                   CHAIRMAN ZIEMER: I'll make a  
9 comment here and then we're going to hear from  
10 John Ramspott. I think John's been waiting in  
11 the queue. My understanding of the TBD-6000  
12 document is that there's a sufficient number  
13 of different facilities from which the data  
14 has been used that it purported to cover, sort  
15 of, the spectrum of the types of uranium  
16 materials, and alloys, and forms that one  
17 would find.

18                   It certainly, in terms of the  
19 exposure rates, would be hard to imagine an  
20 alloy having a higher exposure rate than pure  
21 uranium, so an alloy, itself, would be bounded

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1 by the pure uranium values that one would  
2 otherwise use.

3 All right. John Ramspott, you had  
4 a question that you were waiting.

5 MR. RAMSPOTT: Thanks, doctor.  
6 Yes, it was a clarification in response to Dr.  
7 Anigstein's comment that there was really no  
8 early proof of uranium work at GSI based on  
9 the purchase orders, except for one little, I  
10 think he said, sketchy letter.

11 And I question that because, I'm  
12 actually looking at an AEC research and  
13 development report, NYO--1358, dated October  
14 15th, 1953, and that report clearly spells out  
15 that the pilot plant uranium from Mallinckrodt  
16 was betatron tested.

17 So there's definitely other proof  
18 besides some sketchy little letter. The fact  
19 that the POs don't exist from '53 to '58, I've  
20 said earlier, and I still feel positive that,  
21 if you look, the Weldon Spring plant opened in

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1 June of '58. The Destrehan plant transferred<sup>93</sup>  
2 everything out there.

3 When you transfer one massive  
4 plant to a wholly different plant, there's a  
5 lot of things that can happen. If you look at  
6 the purchase orders, you'll see there is  
7 actually two separate purchasing departments.

8 So the fact that early purchase orders don't  
9 exist, I would have to say that's probably  
10 because somebody didn't look for them with the  
11 MCW documents.

12 And the other point, maybe today,  
13 nobody does anything for the government unless  
14 they have a PO, but I'd like to ask everybody  
15 just to keep in mind the two attachments, and  
16 I was off the phone, I had to take care of  
17 some business real quick, when you were  
18 talking about the two attachments, A, B  
19 letters, talking about some work done for 48  
20 bucks.

21 All you have to do is look at

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1 those letters and they actually say they did  
2 work for Mallinckrodt before any purchase  
3 order was issued. That's what that whole  
4 little dissertation is about, the fact that  
5 they are now trying to collect on something  
6 that was done without a purchase order.

7 So being in business myself, I'll  
8 guarantee you, and I had it happen person,  
9 when the manager of a nuclear power plant  
10 calls and says, I need this, I'll guarantee  
11 you their purchasing people will get on the  
12 phone, have a vendor go out with the product,  
13 and they'll take care of the paperwork later.

14 When an emergency happens, they  
15 don't necessarily take two weeks to cut a  
16 purchase order to get something done. I mean,  
17 I've actually had that personally happen. So  
18 at Mallinckrodt, those two letters that they  
19 were talking about earlier, are proof that it  
20 happened.

21 So I hope that clarifies it and,

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1 Wanda, the type of uranium, I totally<sup>ly</sup>  
2 understand what you're talking about, or I  
3 think I understand what you're talking about,  
4 but Dan, I think, makes a perfect point.

5 There were different types of  
6 uranium that I would be more concerned with,  
7 not the chemical structure, but the size,  
8 shape, because there is a big difference in  
9 exposure when a worker works on 20 pieces of  
10 something in an hour versus 1 of something in  
11 an hour.

12 The exposure has to be greater  
13 because they're in there with it and that  
14 applies to GSI with the corner shots versus  
15 some slice, maybe, that does take two hours,  
16 because they are trying to go through the  
17 entire thickness of it.

18 The ingots, we have that document,  
19 and I have the Mallinckrodt, and I've sent  
20 this before, procedure book that shows what  
21 they were doing. They were shooting those

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1 ingots on the corners to figure out the <sup>96</sup>  
2 thickness of the crust, the slag, so they  
3 could then take it back to have it lathed off.

4 This is a Mallinckrodt document.

5 This states what that's for.  
6 Well, when a worker is shooting 15-minute  
7 shots versus two hours, he's definitely in  
8 there more. It doesn't have to deal, so much,  
9 with the structure of it, is it's the time  
10 you're right next to it. You can do a whole  
11 lot more when you're doing short shots.

12 So I think you both make a valid  
13 point. I'm more worried about the time the  
14 workers are next to it. So thank you. I  
15 appreciate it.

16 CHAIRMAN ZIEMER: Okay. Well, we  
17 keep moving back into the active period, but  
18 on the residual period, we have several  
19 options today. One option is to have a motion  
20 either to agree that doses can be  
21 reconstructed or to agree that they can't.

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1 Another is to defer action pending additional<sup>97</sup>  
2 information if people believe they need more  
3 or there may be additional information that  
4 you wish to request. I don't know if the  
5 surrogate data issue is part of that, Josie,  
6 or if it's part of the main issues on the  
7 Appendix BB itself.

8 But let me hear from Work Group  
9 Members how you wish to proceed in terms of  
10 the residual period.

11 MEMBER BEACH: Paul, this is  
12 Josie. I did want to hear from NIOSH on the  
13 resuspension factor because the points in both  
14 the latest papers kind of reflect back to the  
15 Procedures Work Group and/or the Site Profile.

16 So I just wanted to make sure I understood  
17 that, if Dave could comment.

18 CHAIRMAN ZIEMER: Right. And let  
19 me comment first and then I'll ask Dave or  
20 John Mauro to comment, and Wanda is also here,  
21 representing -- it's the Procedures

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1 Subcommittee, actually, it's not a work group,<sup>98</sup>  
2 but it's a subcommittee, but in any event, it  
3 was pretty well agreed that 1 times 10 to the  
4 minus 6th would only apply to periods that  
5 involve previously cleaned facilities.

6 And I think Bob Anigstein  
7 described it already. And we've already  
8 agreed, I think, that the 1 times 10 to the  
9 minus 6th would not apply here.

10 MEMBER BEACH: Okay.

11 CHAIRMAN ZIEMER: And the --

12 DR. NETON: Dr. Ziemer, this is  
13 Jim Neton. I might take exception to that  
14 characterization.

15 CHAIRMAN ZIEMER: Okay.

16 DR. NETON: I think my  
17 recollection was that we agreed on TIB-70 that  
18 there are a variety of resuspension factors,  
19 and as Bob characterized earlier, we agreed  
20 that they would be taken up on a case-by-case  
21 basis --

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1 CHAIRMAN ZIEMER: Right. 99

2 DR. NETON: -- because the  
3 situations are very different among the  
4 different plants. And it didn't necessarily  
5 determine that the 1 times 10 to the minus 6th  
6 would only be applicable to the facilities  
7 that had been cleaned.

8 CHAIRMAN ZIEMER: Well, okay. I  
9 should I have stated it in the --

10 DR. NETON: That has been SC&A's  
11 position all along.

12 CHAIRMAN ZIEMER: Right.

13 DR. NETON: But we take exception  
14 to that. I think that --

15 CHAIRMAN ZIEMER: Oh, I got you.  
16 Okay.

17 DR. NETON: I think where this  
18 thing lies right now, Josie, is that the 1  
19 times 10 to the minus 6th is debatable. SC&A  
20 has stated their position, but we believe that  
21 there are interpretations of these NRC

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1 documents that we can go through and  
100  
2 demonstrate that it's applicable here.

3 And this, in my opinion, becomes a  
4 Site Profile issue for this particular, you  
5 know, site. You know, I think everyone agrees  
6 there is some number that's valid. It's what  
7 is the valid number, and I think that we would  
8 be willing to discuss this at the Site Profile  
9 level, whether it's 1 times 10 to the minus  
10 6th or 5 times 10 to the minus 5th or some  
11 other value.

12 I think there are NRC documents  
13 out there that talk about aged facilities,  
14 where uranium has been present on the ground  
15 for a period of time having this same  
16 resuspension factor.

17 So anyways, I think we need to  
18 take that up and discuss it further.

19 MEMBER BEACH: Thank you.

20 CHAIRMAN ZIEMER: Okay. So 1  
21 times 10 to the minus 6th, it's not that it

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1 wouldn't necessarily apply in this case, but  
2 that it certainly can be applied in cases  
3 where it's already been cleaned. I think  
4 we've agreed to that.

5 DR. NETON: We did agree to that,  
6 but I think in this particular instance we  
7 would just like further justification for our  
8 use of this value.

9 CHAIRMAN ZIEMER: Right.

10 MEMBER MUNN: And the discussion  
11 is easily referenced in the Procedures  
12 Subcommittee's discussions of the last two  
13 meetings.

14 CHAIRMAN ZIEMER: But it would  
15 have to be established for this facility that  
16 that would assume that it was agreed that this  
17 could be bounded and then it would be an issue  
18 of, what's the correct resuspension factor?

19 DR. NETON: Correct.

20 CHAIRMAN ZIEMER: Okay. Who had a  
21 comment? Bob Anigstein?

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1 DR. ANIGSTEIN: Yes. Well, I just  
2 wanted to answer Jim's comment. He said NRC  
3 would discuss this. Here's a direct quotation  
4 from NUREG-1720, which is an NRC report  
5 referring to the 10 to the minus 6th.

6 It says, it is assumed that  
7 surfaces will be cleaned or washed during  
8 decommissioning. This will remove most of the  
9 loosely bound and some of the more tightly  
10 bound particles. Following the above  
11 discussion, surfaces that have been cleaned  
12 will be expected to have a smaller  
13 resuspension factor than surfaces that have  
14 not been cleaned, given the same level of  
15 contamination.

16 So it specifically limits this to  
17 decommissioned facilities that have been  
18 cleaned up.

19 DR. NETON: I don't disagree with  
20 that statement, but we could take this up at  
21 another event, I think --

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1 DR. ANIGSTEIN: Okay. 103

2 DR. NETON: -- but I've gone  
3 through all the -- Dave Allen and I have  
4 looked at all the studies that they refer to  
5 and I think that there's room for  
6 interpretation. That's all I'm saying.

7 DR. ANIGSTEIN: All right.

8 CHAIRMAN ZIEMER: Any other  
9 comments?

10 DR. ANIGSTEIN: Yes. I'd like to  
11 make a couple of comments on this last part of  
12 the discussion. Dr. McKeel and John Ramspott,  
13 and that is --

14 CHAIRMAN ZIEMER: Are you  
15 discussing the residual period? I don't want  
16 to get back --

17 DR. ANIGSTEIN: I withdraw my  
18 comment.

19 CHAIRMAN ZIEMER: Yes, okay.

20 MEMBER BEACH: All right, Paul,  
21 this is Josie. I think I still need to hear

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1 more on the use of surrogate data from the <sup>104</sup>  
2 slug facility. I'm not a 100 percent clear on  
3 that.

4 CHAIRMAN ZIEMER: Okay. And the  
5 implication for you on this issue of the  
6 residual period is to delay action on it? Is  
7 that --

8 MEMBER BEACH: For the residual  
9 period, yes, because it's my understanding  
10 that it's all surrogate data based on OTIB-70  
11 and 6000, and I just want to be -- I'm just  
12 not quite clear on how those two meet with the  
13 criteria that we had set up. So that's just  
14 me.

15 CHAIRMAN ZIEMER: Yes. That's  
16 fine. Are you making a motion to defer action  
17 on the residual period?

18 MEMBER BEACH: Yes, I believe I  
19 am. I will say that I would like to wait  
20 until I see some more on that topic.

21 CHAIRMAN ZIEMER: Okay. There's a

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1 motion. Is there a second? 105

2 MEMBER POSTON: Paul, I'll second  
3 it so we can discuss it.

4 CHAIRMAN ZIEMER: Okay. So a  
5 motion is to defer action on the residual  
6 period. Now, the effect of that would be,  
7 when we report to the Board next week, we  
8 would have a report on Work Group actions on  
9 the active period and then actions on the  
10 residual period.

11 Now, the Work Group simply brings  
12 recommendations. The Board is not obliged to  
13 accept our recommendations one way or the  
14 other. They may choose to defer everything.  
15 They may choose to vote on everything. All  
16 this would be, would be a recommendation and I  
17 guess, Josie, if the motion passes, the Board  
18 would spend additional time on the residual  
19 period as well as dealing with other issues on  
20 the main Appendix BB site profile, or Appendix  
21 BB document.

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1 MEMBER BEACH: Absolutely. 106

2 CHAIRMAN ZIEMER: Other comments?

3 Ted, did I state that correctly from a, sort  
4 of, a procedural point of view? The Board can  
5 do as it wished on this.

6 MR. KATZ: Yes. I mean, the Board  
7 trumps the Work Group in any event. Yes.

8 CHAIRMAN ZIEMER: Now, it's  
9 probably unlikely that the Board would go  
10 ahead and act if the Work Group recommended  
11 deferring action on this and there are cases  
12 where, and in fact, any number of cases where  
13 we've dealt with the residual period  
14 separately from the main period on a petition,  
15 isn't that correct?

16 MR. KATZ: Yes. I mean, normally,  
17 the Board waits and lets the Work Group  
18 complete its work. And where a Work Group is  
19 asking to do more work to resolve an issue, I  
20 mean, the Board has always respected those  
21 requests from the Work Group. In fact, I

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1 suspect it would in this case too. 107

2 DR. ANIGSTEIN: This is Bob  
3 Anigstein, I just want to make one comment,  
4 and that is, the question of the -- I mean,  
5 I'm not sure that this is, you know, my proper  
6 place to comment on this, but what we're  
7 really talking about is the intake of uranium  
8 dust, the internal. I mean, there is a small  
9 external dose during the residual period, but  
10 it's a very, very minor part of the total dose  
11 in any dose reconstruction.

12 And if there is uncertainty about  
13 the internal dose, about the intake of  
14 uranium, it would have a much more of an  
15 effect on the operational period than on the  
16 residual period.

17 All of the uranium source term in  
18 the residual period is based on assumptions  
19 about the uranium contamination levels and the  
20 uranium air concentration during the  
21 operational period.

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1 So I just want -- 108

2 CHAIRMAN ZIEMER: Well, that's  
3 correct and I think that, for the residual  
4 period, and maybe Jim Neton, or Dave Allen,  
5 can help me on this, but I think that it's  
6 only the inhalation that would deliver any,  
7 sort of, I don't necessarily want to call it  
8 significant, but compared to external, it's  
9 the inhalation, and certainly, even much  
10 greater than ingestion, would be orders of  
11 magnitude greater, I would think, than the  
12 other two components, is that not correct?

13 DR. NETON: That's correct for the  
14 residual period, but I think what Bob is  
15 pointing out, which is --

16 CHAIRMAN ZIEMER: Yes, I  
17 understand that, but on the residual period,  
18 the only issue is inhalation.

19 DR. NETON: It's the key issue I  
20 think. Yes.

21 MEMBER BEACH: So you're saying

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1 there would be no ingestion during that time  
109  
2 period; or limited?

3 CHAIRMAN ZIEMER: Well, I think  
4 even if you postulated ingestion, and you  
5 certainly would, and also external exposure,  
6 those numbers are going to be orders of  
7 magnitude less than you would get from, I  
8 think, inhalation whatever number you selected  
9 for the contamination level.

10 DR. ANIGSTEIN: Yes, this is Bob,  
11 I've reviewed a number of the dose  
12 reconstructions, and in all cases, the  
13 ingestion dose with the current NIOSH  
14 methodology is about two orders, just off the  
15 top of my head, two orders of magnitude,  
16 typically, factor of a 100, or maybe even  
17 smaller, than the inhalation.

18 Assuming the same source term,  
19 assuming the same amount of activity, uranium  
20 activity in the air at resuspension, it is a  
21 much, much smaller quantity. So I personally,

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1 when I reviewed these, I even stopped paying  
2 attention to ingestion because, no matter what  
3 it is, it's not going to affect the dose  
4 reconstruction.

5 CHAIRMAN ZIEMER: Other comments?

6 We have a motion on the floor to defer action  
7 on the residual period, for the Work Group to  
8 defer action today. Okay. No other comments.

9 Are you ready to vote?

10 MEMBER POSTON: Paul, I still need  
11 some clarification. I know we've been going  
12 around and round, but I guess the question is,  
13 what's going to happen and who's going to make  
14 it happen if we go to the Board next week and  
15 say, we deferred action.

16 Ted says they can override us but  
17 they're unlikely to. So does that mean we're  
18 going to do it ourselves?

19 CHAIRMAN ZIEMER: Well, that means  
20 at our next meeting, I mean, we still have  
21 work before us regardless, just on -- let's

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1 say the Board decides that there either would  
2 or would not be an SEC, we still have to  
3 resolve the issues on the TBD-6000 Appendix  
4 BB, the main document, because you always will  
5 have dose reconstructions.

6 Even if you had an SEC, you have  
7 to do dose reconstructions for people who  
8 don't get one of the specified cancers or who  
9 don't meet the 250-day criteria.

10 If there is no SEC, you still have  
11 to do that, so we still have work to do and  
12 all this would do would be to keep the  
13 residual period open for further discussion  
14 and maybe resolution of the question that  
15 Josie raised as to, I think, the question of  
16 whether or not there's a surrogate analogy  
17 that's correctly applied here, I guess, was  
18 the question, right, Josie?

19 MEMBER BEACH: Yes. That's pretty  
20 close. So just to be clear, Paul. We've got  
21 two periods. The operational period is going

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1 forward to the Board. The residual period<sup>112</sup> is  
2 in question. Is that correct?

3 CHAIRMAN ZIEMER: That's correct.

4 MEMBER BEACH: Okay.

5 MR. KATZ: This is Ted. Paul?

6 CHAIRMAN ZIEMER: Yes.

7 MR. KATZ: Okay. I want to make  
8 certain I was off mute. I'm finding myself a  
9 little bit confused about what's the thinking  
10 here, and this is just to amplify what Bob  
11 just raised.

12 I mean, if there's an issue about  
13 the use of surrogate data here, I'm wondering  
14 if, one, if you can't actually hash it out  
15 now, because you've been involved in the TBD-  
16 6000 review, actually, there's quite a lot of  
17 discussion already, and knowledge, with  
18 respect to the basis for that, and you have  
19 Jim Neton on the line, he knows quite a lot  
20 about that too.

21 The reason I raise that question

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1 is because, if you have a question about the  
2 surrogate data, the surrogate data is applied  
3 during the operational period as well as the  
4 residual period. I'm misunderstanding, I  
5 guess, if there's a reason to distinguish in  
6 terms of addressing surrogate data.

7 CHAIRMAN ZIEMER: Well, I guess  
8 this issue just has come up. I can't say  
9 beyond that. You know, a question's been  
10 raised as to whether or not this is  
11 appropriate.

12 MEMBER BEACH: And meets the  
13 criteria that the Board set up.

14 DR. MAURO: This is John Mauro.  
15 Maybe I can help out a little bit here. It  
16 would always be convenient to be able to  
17 separate the operations period and, of course,  
18 then the Board and the Work Group could  
19 recommend an SEC, because I know that's before  
20 us on the operations period. And then  
21 separate that and the residual period from

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1 that, but we have a little bit of  
2 unfortunately, a monkeywrench in this. The  
3 methodologies, the assumptions that were used  
4 to do the residual period, and Bob, please  
5 clarify, are also used in the in-between times  
6 during the operations period.

7 CHAIRMAN ZIEMER: Exactly.

8 DR. MAURO: And so you have  
9 resuspension going on with the surrogate data  
10 during operations. So, in a way, you really  
11 can't parse them cleanly. So if you're going  
12 to speak about the operations period, and, of  
13 course, we've addressed many, many SEC issues  
14 and the Board has actually come to a position  
15 regarding the operations period and the  
16 various external exposures, but what we have  
17 before us now is that the resuspension issue  
18 of surface contamination is an exposure part  
19 of the operations period also.

20 Now, that being said, the question  
21 becomes, can it be resolved over the phone

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1 now? That is, because it does have play, not  
2 only during the residual period, but it also  
3 has play during the operations period.

4 And all I can say is this: that  
5 TBD-6000 offers up a whole menu of exposure  
6 scenarios associated with the handling of  
7 metal, uranium metal. A whole range of them.

8 And it is a judgment call which of those  
9 scenarios are best suited as a surrogate for  
10 any particular facility where you don't have  
11 the airborne data and you could go to one of  
12 the more extreme scenarios.

13 I have to say, off the top of my  
14 head, I don't recall whether slug machining is  
15 one of the higher scenarios where you're  
16 really generating lots of aerosols. I suspect  
17 it might be.

18 DR. ANIGSTEIN: No.

19 DR. MAURO: No? I'm wrong?

20 DR. ANIGSTEIN: No, it's not.

21 DR. MAURO: Okay. My apologies.

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1 And I'm not trying to draw conclusions here<sup>116</sup>  
2 What I'm trying to say is, though, I think the  
3 issue that's in front of us is, do we have an  
4 SEC issue in front of us with respect to  
5 surrogate data? Yes, this is surrogate data.

6 This draws from TBD-6000.

7 TBD-6000 has been thoroughly  
8 vetted and has all been agreed that the sweep  
9 of operations on uranium metal have been  
10 exhaustively studied by a very large amount of  
11 data which captures the full range of kinds of  
12 activities that could have taken place to  
13 generate an aerosol.

14 And so one could argue, since  
15 that's been vetted, and it's been agreed, that  
16 somewhere in that distribution you could find  
17 a bounding scenario that applies to your  
18 circumstance. One could argue, then, the  
19 surrogate issue has been resolved. It's just  
20 a matter of picking the right scenario.

21 So one could argue, well, then

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1 it's not an SEC issue. We may disagree that <sup>117</sup>  
2 the slug handling is the most limiting, but we  
3 probably, certainly could find one that is  
4 more appropriate and more bounding.

5 So in one respect, the person  
6 could argue, well, it's not an SEC issue  
7 because of that. On the other hand, until you  
8 actually do that, and in this respect, I would  
9 be saying something that would support with  
10 Josie, well, until you actually do that, you  
11 haven't really put the surrogate issue to bed.

12 So I mean, what I'm trying to do,  
13 as best I can, is show both sides of the  
14 judgments that have to be made at this time.

15 CHAIRMAN ZIEMER: In principle, if  
16 one were to say that the uranium slug scenario  
17 is inappropriate, you could select a different  
18 one on a TBD-6000, because I don't recall  
19 where the slug thing was in terms of air  
20 concentrations, but certainly it wasn't the  
21 highest.

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1 DR. ANIGSTEIN: No, Dr. Ziemer<sup>118</sup>

2 Actually, it's the lowest.

3 DR. MAURO: Oh, okay. It's one of  
4 the lower ones. And, Paul, you're right. So  
5 the question is, well, let's say, in the end  
6 of the process one judges that, well, perhaps  
7 there's a more appropriate, more limiting --  
8 so, I guess, here's the question, since we've  
9 already agreed that TBD-6000 does establish  
10 boundaries on airborne dust loadings  
11 associated with the handling of uranium for  
12 virtually every circumstance we might  
13 encounter, and that's why it was reviewed, to  
14 see, does it do a good job in accomplishing  
15 that.

16 On that basis, one could argue  
17 that, all you really have is a site profile  
18 issue, to pick the right one within that  
19 range. So that would be one side of the  
20 argument. The other side would be, well,  
21 until you actually do that, it might still be

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1 an SEC issue. 119

2 And I think that's the question  
3 that's before the Work Group at this time.

4 CHAIRMAN ZIEMER: Well,  
5 previously, we had agreed that the TBD-6000  
6 approach would bound the airborne activity for  
7 the active period.

8 And in principle, if you say that,  
9 then you would say, then it also will apply in  
10 the residual period, and then it's a matter of  
11 selecting the correct resuspension factor,  
12 which is, you know, it could still be debated,  
13 but at least, in principle, you can  
14 reconstruct dose with that approach.

15 And if we opened the residual  
16 period and say we're not prepared to make a  
17 recommendation, I guess, Ted, you're asking,  
18 does that, in principle, say then, why could  
19 you do it for the active period?

20 DR. ANIGSTEIN: This is Bob. If I  
21 can comment. Just, perhaps, to refocus. The

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1 residual period does not directly use  
2 surrogate data from TBD-6000. What is used is  
3 -- the air concentration that's listed in TBD-  
4 6000 for the slug production operator is used,  
5 then, to calculate the deposition on the  
6 surfaces.

7 Then it is assumed that the  
8 highest year based on the maximum number of  
9 hours in a given year for uranium handling,  
10 assuming that whatever gets deposited during  
11 that year, then it remains constant from that  
12 year, which is, I think, 1961 through 1993.

13 So it's simply, whatever is  
14 deposited, using the TBD-6000 numbers for the  
15 deposition rate, then remains on the ground,  
16 on the floors and continues on. So the two  
17 are inseparable. If you accept the surface  
18 concentration during the operational period,  
19 then it simply continues during the residual  
20 period.

21 CHAIRMAN ZIEMER: Right. Right.

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1 And what I was saying was, sort of, <sup>in</sup>~~121~~  
2 reverse, if you don't accept it for the  
3 residual period, why did you accept it for the  
4 active period? Yes.

5 DR. MAURO: Yes.

6 DR. ANIGSTEIN: Exactly, agree.

7 DR. MCKEEL: Dr. Ziemer?

8 CHAIRMAN ZIEMER: Yes.

9 DR. MCKEEL: I know this is not my  
10 time, so to speak, but I really would  
11 appreciate being able to put a short sentence  
12 on the record.

13 CHAIRMAN ZIEMER: Sure.

14 DR. MCKEEL: And that is, this is  
15 not the first time that I brought up about the  
16 inappropriateness of the slug facility and the  
17 use of surrogate data related to that  
18 facility. Now we've learned that the amount  
19 of airborne uranium from that facility was one  
20 of the lowest, or lowest, of the scenarios in  
21 TBD-6000.

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1                   My previous comments were really<sup>122</sup>  
2                   made in conjunction with the operational  
3                   period and I think it would be fair to say, as  
4                   has been confirmed this morning, that although  
5                   that subject has been brought up, that no  
6                   other TBD-6000, Class 6001, or TBD-6000 Work  
7                   Group Member has ever called for a formal  
8                   comparison to see whether the slug facility  
9                   meets the Board's surrogate data criteria.

10                   So, you know, of course, I applaud  
11                   the idea of doing that. I think it's  
12                   absolutely necessary. And, you know, I think  
13                   all the comments made by Dr. Mauro just now,  
14                   and Dr. Anigstein, point to the fact that the  
15                   surrogate data issue transcends the period and  
16                   stretches all the way from 1952 to 1992.

17                   So I strongly encourage that that  
18                   needs to be done and that that be factored  
19                   into the equation. Thank you.

20                   CHAIRMAN ZIEMER: Thank you.  
21                   Board Members, any other comments? Okay. So

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1 we have a motion to defer action on ~~the~~<sup>123</sup>  
2 residual period. Are you ready to vote? I  
3 guess we need to do it by roll call, Ted.  
4 Ted, are you on there?

5 MEMBER BEACH: He's probably  
6 muted.

7 MR. KATZ: I am. Thank you,  
8 Josie.

9 MEMBER BEACH: You're welcome.

10 MR. KATZ: If I could get us to  
11 vote with a very good roll call. Okay. Now,  
12 let's do this again.

13 Dr. Poston.

14 MEMBER POSTON: Yes.

15 MR. KATZ: Okay, so that's a yes  
16 to deferring. Okay, and then Ms. Munn.

17 MEMBER MUNN: No, I think we've  
18 covered that previously.

19 MR. KATZ: And then Ms. Beach.

20 MEMBER BEACH: Yes.

21 MR. KATZ: And then Dr. Ziemer.

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1                   CHAIRMAN ZIEMER:     I guess I'll  
2                   vote to defer.     I don't know that it  
3                   accomplishes anything at this point, but I'll  
4                   try to accommodate here the concerns of our  
5                   fellow Board Member.    So I guess the motion  
6                   carries then, correct?

7                   MR. KATZ:           Yes.     The motion  
8                   carries.   That's three votes in favor.

9                   CHAIRMAN ZIEMER:   Okay.   So I will  
10                  report to the full Board that we're not ready  
11                  to make a recommendation yet on the residual  
12                  period.

13                  MEMBER BEACH:       And will we see  
14                  some work on this surrogate data issue, Paul?  
15                  What's the thought there?

16                  CHAIRMAN ZIEMER:   Well, you know,  
17                  we'll have to schedule a Work Group meeting  
18                  later in the summer after our Board meeting is  
19                  over and then we'll have that on the agenda.  
20                  I don't know at this point, I need to look at  
21                  this, but I don't know if we need to -- got to

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1 think about this, well, I guess, let's find<sup>125</sup>  
2 out what the Board wishes to do at this point.

3 But I think what we'll need to do,  
4 and the full Board can task this, I think we  
5 may need to ask SC&A to look at that issue.  
6 Is this an appropriate surrogate for GSI?  
7 Ted, is that something we can task at the  
8 meeting?

9 MR. KATZ: Yes, we can task it now  
10 or at the meeting, but since you're going to  
11 end up discussing this at the meeting anyway,  
12 we'll task it at the meeting. Unless  
13 something unexpected happens at the Board  
14 level, even if you don't state it at the Board  
15 meeting, I'll make sure that this is tasked  
16 immediately after.

17 And certainly, SC&A is not going  
18 to get to this before the meeting, so there's  
19 no real reason to task it right now.

20 CHAIRMAN ZIEMER: Right. There's  
21 no time to do anything between now and then

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1 anyway. 126

2 MR. KATZ: Right. I think so.

3 DR. NETON: Paul, this is Jim.  
4 I've got a question. I'm a little bit  
5 confused as to what is going to be the Work  
6 Group's position on covered period now?

7 CHAIRMAN ZIEMER: I think that  
8 nothing has really changed on the covered  
9 period. I mean, intrinsically, it appears  
10 that it has, but we've only taken this action  
11 on the residual period right at the moment.

12 DR. NETON: Well, I'm not sure how  
13 you can do that because, like, as Bob pointed  
14 out, they're inseparable. If the conclusion  
15 comes to be that it's inappropriate use of  
16 surrogate data, it affects the covered period  
17 as well. I mean, they're the same thing. I  
18 don't know, I guess I'm confused as to how one  
19 would --

20 DR. MAURO: Jim, I agree with you.  
21 This is John.

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1 DR. NETON: I don't know how you ~~127~~  
2 can take two different positions when the same  
3 issue appears in both pieces.

4 MEMBER MUNN: Exactly.

5 CHAIRMAN ZIEMER: That's exactly  
6 right.

7 DR. ANIGSTEIN: If I could make a  
8 suggestion, this is Bob, perhaps since I spoke  
9 up about saying that the slug production is  
10 the lowest concentration of the ones that were  
11 considered here, the reason they used slug  
12 production is that every other operation, and  
13 perhaps Dave Allen can clarify this in more  
14 detail, involved much more disturbance of  
15 uranium.

16 I mean, there's just a list of  
17 these in summary on the tables. It's not a  
18 long list. Extrusion, rolling, forging,  
19 machining, and scrap recovery. So each of  
20 these, I believe, NIOSH considered involved  
21 actually roughing up the uranium, certainly

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1 machining, whereas, the slug production<sup>128</sup>  
2 involved the least amount of handling and is  
3 closest to what happened at GSI, where there  
4 was no disturbance, except inadvertent, as Dr.  
5 McKeel pointed out, putting the chains on.

6 So when I said it's the lowest, we  
7 did not question. We did review this,  
8 originally, as part of our Appendix BB review,  
9 and we agreed that this was a limiting  
10 scenario, if anything, it was a conservative  
11 scenario because it probably involved more  
12 disturbance of the uranium than was used.

13 And then furthermore, NIOSH now  
14 used, again, in the slug production, and you  
15 have four categories of workers, depending how  
16 close they were to uranium: operator, general  
17 laborer, supervisor and clerical.

18 And basically, the same air  
19 concentration, but said, well, the operator is  
20 there eight hours a day, the general laborer  
21 goes in only half the time because he has

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1 other work, the supervisors are even less <sup>and</sup>  
2 the clerical is even less. <sub>129</sub>

3 So there was a very good  
4 rationale. You know, we're talking about  
5 tasking SC&A, I should be saying, gee, don't  
6 give us any more work, but at the moment, we  
7 can say, we did review this issue. We can  
8 certainly do more reviews on it, but it has  
9 not been left untouched, unquestioned.

10 And, you know, as has been made  
11 clear, we had a number of comments, issues,  
12 criticisms of NIOSH's methodology and  
13 assumptions about the operational period, and  
14 those were primarily external doses, this  
15 wasn't one of them.

16 We thought that this was a  
17 reasonable assumption. If anything, it was a  
18 very conservative one, but was based on the  
19 data available, the studies they have made,  
20 this was the best. This was the most suitable  
21 and claimant-favorable.

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1 DR. MAURO: This is John, I think<sup>130</sup>  
2 we're asking the right questions here. Dr.  
3 McKeel brought up a point that says, well, I  
4 think it may very well have been roughed up a  
5 bit, perhaps roughed up in a way that might  
6 have been of a different nature and different  
7 type than, let's say, the way the slugs were  
8 handled, okay?

9 So let's assume that for a minute.  
10 We don't know for sure. We haven't aired it  
11 out, but the real question, this goes toward  
12 whether or not you could address the SEC issue  
13 for the operations period at the Board meeting  
14 or does this prevent you from being able to do  
15 that until you get resolution.

16 I would argue, and I'll do what I  
17 often do, but when we looked at the range of  
18 activities that are embraced by TBD-6000, and  
19 Bob just alluded to it, it's all coming back  
20 to me, one could ask the question, could you  
21 conceive of the possibility that we can't find

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1 one of those scenarios which we believe to be<sup>131</sup>  
2 plausibly bounding as applied to GSI?

3 Okay? Now, here's where I will  
4 gladly stick my neck out, because I think it  
5 needs to be done, I am very close with what's  
6 going on in GSI, I am very close with TBD-  
7 6000, and I could say with a high degree of  
8 confidence that you can find a scenario within  
9 the full range of scenarios, and not only the  
10 kinds of things they did, but the class of  
11 workers, the matrix, that would bound the  
12 operations and circumstances that, I  
13 understand and I'm familiar with, took place  
14 at GSI.

15 If you accept that, and I fully  
16 understand why you may not want to accept my  
17 making such an outrageous statement at this  
18 time, and just leap to a conclusion, I find  
19 that, you know, my sense is, because I have  
20 been working so close to this, my belief is  
21 that we're dealing with a site profile issue

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1 is, the boundaries are there, did we pick the <sup>132</sup>  
2 right boundary?

3 But you certainly could find one  
4 and as I said, I know I'm sticking my neck out  
5 a bit, but I feel as though I can, because of  
6 how much time I've spent on both these  
7 subjects.

8 Now -- because I am concerned  
9 that, unless I said what I just said, it's  
10 very possible that it's not going to be  
11 possible for you to address the SEC issue,  
12 which we've been waiting for a long time, on  
13 the operations period, unless I made the  
14 statement I just made.

15 CHAIRMAN ZIEMER: Well, in  
16 essence, if we defer the residual period, then  
17 we almost have to defer the main period as  
18 well because they are -- it's one or the  
19 other. We either can or we can't and if  
20 there's a question about whether you can do  
21 that and use this as a surrogate, you know, my

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1 own feeling is that, if one decides that it's  
2 a different scenario, you can select a  
3 different one, but it can be bounded.

4 DR. MAURO: Does that make it an  
5 SEC issue which would prevent the Board from  
6 making a judgment on whether to grant or deny  
7 the SEC?

8 CHAIRMAN ZIEMER: I mean, you can  
9 still go back and see if you selected the  
10 right, if you want to call it, surrogate from  
11 TBD-6000. You can still do that either way.  
12 I mean, you can still recommend an SEC for the  
13 residual period and still examine what value  
14 you're going to use.

15 But if we say that, I think Jim  
16 Neton is quite correct that, you can't have it  
17 both ways. You know, you can't recommend  
18 going ahead on the main period and not  
19 recommend going ahead on the other based on  
20 this issue. So that's the dilemma.

21 MEMBER MUNN: This is Wanda. I'm

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1 sorry I didn't speak sooner when we were <sup>134</sup>  
2 debating prior to calling a vote, but the  
3 reason that I voted no is because this issue,  
4 in my memory, was well vetted when we  
5 addressed the original TBD-6000 document.

6 And it has the feel to me of re-  
7 invention. It isn't as though we haven't been  
8 here before and my memory was that this was  
9 satisfied, accepted for our purposes and the  
10 Board's use.

11 CHAIRMAN ZIEMER: Any other  
12 comments?

13 MR. KATZ: I'll just note, and of  
14 course, it's just a matter of procedure. I  
15 mean, you can take another vote on the matter  
16 you just voted on as well, if you want to  
17 think differently about it, having heard from  
18 John.

19 CHAIRMAN ZIEMER: Well, and we  
20 could also recommend deferring action on the  
21 SEC till later as well.

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1 MR. KATZ: Right. Indeed. 135

2 CHAIRMAN ZIEMER: As a matter of,  
3 sort of, practicality for the Board, and  
4 particularly for the new Members, there's a  
5 lot of material to absorb and one would wonder  
6 whether or not the Board is going to be ready  
7 to vote in any event on this issue; on either  
8 the active or the residual period.

9 MEMBER BEACH: Well, Paul, I'll  
10 step out and make a motion that we also  
11 postpone the operational period, but I do  
12 believe that we need to take a full time to  
13 review this before the Board. So my motion is  
14 to postpone the operational period as well as  
15 the residual.

16 CHAIRMAN ZIEMER: Postpone action.

17 MEMBER BEACH: Yes.

18 CHAIRMAN ZIEMER: In other words,  
19 we would bring to the Board the findings to  
20 date but recommend that action not be taken at  
21 this meeting. You're making that as a motion?

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1 MEMBER BEACH: Yes. Well, we can  
2 clean it up and just say my motion is to delay  
3 the operational period as well as the  
4 residual, so just operational.

5 CHAIRMAN ZIEMER: Delay action --

6 MEMBER BEACH: Delay action, yes.

7 CHAIRMAN ZIEMER: All right. Is  
8 there a second to that motion? I'm not  
9 hearing a second.

10 MEMBER BEACH: No.

11 MEMBER POSTON: Paul, I second --

12 CHAIRMAN ZIEMER: We do have a  
13 dilemma, though, that --

14 MEMBER BEACH: Dr. Poston was --

15 CHAIRMAN ZIEMER: Yes, John.

16 MEMBER POSTON: Yes, I'll second  
17 the motion so we can get out of this dilemma.

18 CHAIRMAN ZIEMER: Okay. The  
19 motion has been seconded. So we would proceed  
20 and present everything, but recommend that  
21 action not be taken on the SEC at this

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1 meeting. That would give us time to resolve<sup>137</sup>  
2 any open question on this issue of what you  
3 might call a surrogate data issue as it  
4 applies to both the residual period and the  
5 operational period. Is that the motion?

6 MEMBER BEACH: Yes.

7 CHAIRMAN ZIEMER: I mean, the  
8 motion doesn't have to say anything about the  
9 surrogate data part, it just says that we're  
10 not recommending action at this meeting.

11 MR. KATZ: This is Ted, and I  
12 think whether it's in the motion or not, I  
13 would think you would want to explain to the  
14 Board the surrogate data issue, where it  
15 stands, and that that's the basis for your  
16 recommendation.

17 CHAIRMAN ZIEMER: Right. Even  
18 though, in principle, we covered that on the  
19 operational period, but it's sort of been  
20 reopened, I guess you'd have to say. Okay.  
21 Any other comments? Anyone want to speak

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1 against the motion?

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2 MEMBER MUNN: I'll speak against  
3 the motion simply because I do believe we are  
4 revisiting material that we have addressed in  
5 other places and we're getting into a do-loop  
6 here. Everyone wants to move forward with  
7 this and have a definition on it, and yet, we  
8 repeatedly ask for additional opportunity to  
9 review data that we have.

10 It just seems to me that we're in  
11 a do-loop. So I speak against it.

12 CHAIRMAN ZIEMER: Okay. Anyone  
13 else? Okay. Let's vote. This is to  
14 recommend that no action be taken on the SEC  
15 petition at this meeting.

16 MR. KATZ: Right. So, Dr. Poston?

17 MEMBER POSTON: Yes.

18 MR. KATZ: Ms. Beach.

19 MEMBER BEACH: Yes.

20 MR. KATZ: Wanda Munn.

21 MEMBER MUNN: No.

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1 MR. KATZ: And Dr. Ziemer. 139

2 CHAIRMAN ZIEMER: Yes.

3 MR. KATZ: Okay. The motion  
4 passes, three in favor. So there will not be  
5 a recommendation for action on this SEC by the  
6 Work Group.

7 CHAIRMAN ZIEMER: Okay. I believe  
8 that concludes our business for today. Any  
9 other items that need to come before us?

10 MEMBER MUNN: None here.

11 CHAIRMAN ZIEMER: If not, we'll  
12 see you all next week at the meeting in Santa  
13 Fe. Thank you very much. We are adjourned.

14 (Whereupon, the above-entitled  
15 matter went off the record at 11:41 a.m.)

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