

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

2 (9:02 a.m.)

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

9 (Roll call.)

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

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

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1 General Steel Industries, Battelle TBD-6000_g
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't₁₃
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 entire¹⁶
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,¹⁷
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^a₁₈
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, and¹⁹
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, which²⁰
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 1989₂₁

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 that²²
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 in
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 slug²⁹
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 ²⁷
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 absence²⁸
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 cleaner³⁰
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, there³³
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 co₃₄
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 program³⁵
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 data³⁷
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 reversed³⁹
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 latest⁴
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 over⁴⁵
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,⁴⁷
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 end⁴⁸
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 ⁵⁰
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 hours⁵¹
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-between⁵²
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 spent⁵³
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 the⁵⁴
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 be⁵³
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, when⁵⁷
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&A⁵⁸
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 frustration⁵⁹
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 1989⁰²
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 outlined⁶³
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
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 ⁶⁶
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 worker⁶⁷
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 General⁷¹
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~~⁷³
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.

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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 off⁸¹
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 mysterious⁸³
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 even⁸⁶
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 composition⁸⁷
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 reports⁹⁰
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 those⁹¹
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 transferred⁹³
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^{ly}
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 ⁹⁶
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 additional⁹⁷
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,⁹⁸
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 ¹⁰⁴
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, is 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 period¹¹² 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 here¹¹⁶
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 ¹¹⁷
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. Ziemer¹¹⁸

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, ⁱⁿ~~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 really¹²²
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~~¹²³
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 find¹²⁵
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 production¹²⁸
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 and
2 the clerical is even less.

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 think¹³⁰
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 be¹³¹
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 ¹³²
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 ¹³⁴
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 resolve¹³⁷
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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