

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

convenes the

WORKGROUP MEETING

ADVISORY BOARD ON  
RADIATION AND WORKER HEALTH

PART 2

The verbatim transcript of the Meeting of the  
Advisory Board on Radiation and Worker Health  
Workgroup held in Cincinnati, Ohio, on Aug. 4, 2005.

C O N T E N T S

Aug. 4, 2005

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### TRANSCRIPT LEGEND

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-- (sic) denotes an incorrect usage or pronunciation of a word which is transcribed in its original form as reported.

-- (phonetically) indicates a phonetic spelling of the word if no confirmation of the correct spelling is available.

-- "uh-huh" represents an affirmative response, and "uh-uh" represents a negative response.

-- "\*" denotes a spelling based on phonetics, without reference available.

-- (inaudible)/ (unintelligible) signifies speaker failure, usually failure to use a microphone.

In the following transcript (off microphone) refers to microphone malfunction or speaker's neglect to depress "on" button.

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

1 (Whereupon, the following occurred after the  
2 break. See transcript, Part 1.)

3 **MR. GRIFFON:** Hans, are you still there with  
4 us?

5 **DR. BEHLING:** (Off microphone) Yes, I am.

6 **MR. GRIFFON:** All right. We --

7 **DR. BEHLING:** (Off microphone) (Unintelligible)  
8 my question is does everybody have a copy of  
9 (unintelligible).

10 **MR. GRIFFON:** Yes, we -- we've got your --  
11 we've got the copy now, so --

12 **DR. BEHLING:** (Off microphone) Let me  
13 (unintelligible) what I believe is a  
14 (unintelligible) of what the problem may be,  
15 and I'll (unintelligible) confine myself to the  
16 (unintelligible) first set of (on microphone)  
17 conversions which (off microphone) converts the  
18 HP-10 or (unintelligible).

19 (NOTE: An apparent malfunction of the  
20 telephone connection rendered only random words  
21 intelligible to the reporter, but were not in a  
22 sequence sufficient to provide any context to  
23 Dr. Behling's statement.)

24 **MR. GRIFFON:** Well, I -- Jim, if you want to  
25 respond now, I -- I think, Hans -- this is Mark

1 Griffon. I feel like this is a task three  
2 issue that's going to cut across a lot of  
3 sites, and I'm not sure that it really is in --  
4 I mean even if -- even if this values are  
5 incorrect, I don't think it limits us from  
6 being able to do dose reconstruction. They  
7 just have to correct them if -- if that comes  
8 out of our task three review. But I don't -- I  
9 don't know that it holds up -- I don't want it  
10 to sidetrack our Mallinckrodt process.

11 Jim, if you wanted to respond briefly --

12 **DR. NETON:** Well, I'm -- we -- we've seen this  
13 comment before in the task three report and  
14 we're -- we certainly feel that it's -- it's a  
15 significant issue that we need to address.  
16 We're not prepared at this meeting to address  
17 that because, frankly, this is not one of the  
18 issues raised in the site profile review. I do  
19 agree this is more of a generic issue that  
20 certainly demands attention, but I'm -- I'm  
21 frankly just not prepared to address it here at  
22 this meeting.

23 **MR. GRIFFON:** I think we'll -- we'll save that  
24 for our task three review, which I think is  
25 going to be sooner rather than later, so --

1 Arjun has one point. Hold on.

2 **DR. MAKHIJANI:** Yeah, Mark and Jim, the -- the  
3 reason that John and Hans and I talked about it  
4 -- I've -- just going over all the issues and I  
5 was trying to get a grip on what all there is  
6 to address, is depending on how the Board acts  
7 in Mallinckrodt, if the dose reconstructions  
8 are going to be done for Mallinckrodt in an  
9 expeditious way, then it presumes that this  
10 very major issue will be sorted out and if in  
11 fact Hans is right that things need to be  
12 adjusted and there's another factor of two  
13 because of angle and these dose conversion  
14 factors need to be changed, then obviously it  
15 needs to be addressed reasonably soon and  
16 presumably in principle it can be addressed, I  
17 don't know. It's -- it came up in that context  
18 and that's why -- I don't know, John, if I'm  
19 out of turn, but that's why we thought it was  
20 appropriate to introduce it here.

21 **DR. MAURO:** Yeah, basically it was my call from  
22 talking to -- and look -- you know what really  
23 triggered it, when we saw the 2.1 adjustment  
24 factor to account for the geometry that was  
25 part of your TIB, that's when we decided to

1 talk about well, are there any other adjustment  
2 factors in this -- said well, yeah, but -- and  
3 -- and we thought, given the expedited nature  
4 of this particular process, we needed to alert  
5 the Board as early as possible to this issue  
6 and -- as opposed to waiting until October when  
7 our task three expedited review would start.  
8 So I -- I -- I think we've accomplished what we  
9 wanted to --

10 **DR. NETON:** Right.

11 **DR. MAURO:** -- just simply to alert the Board  
12 that we think we have an important issue here,  
13 two points that Hans made, the orientation and  
14 the dose conversion factors. And I think we --

15 **MR. TAULBEE:** (By telephone) (Unintelligible)

16 **MR. GRIFFON:** Oh, sure.

17 **MR. TAULBEE:** (Unintelligible) couple of things  
18 (unintelligible) briefly touch on  
19 (unintelligible) we did not (unintelligible)  
20 dose reconstruction (unintelligible).

21 **DR. BEHLING:** And I agree with you, Tim, but  
22 (unintelligible).

23 **MR. TAULBEE:** (Unintelligible) particular  
24 comment and (unintelligible) appropriate  
25 (unintelligible).



1           Dave Allen, with my oversight, has put together  
2           a -- a workup on this to provide some example  
3           cases. We're passing around to the Board --  
4           and there's certainly copies available at the  
5           back of the room -- these examples, but they  
6           really lend themselves to presentation format.  
7           I just provide them for -- for the record, and  
8           what -- what we've done is -- and I'll set the  
9           stage and then I'll let Dave explain the logic  
10          sequence behind what we have here.  
11          But we tried to take a worker who had a fair  
12          amount of bioassay data, and that's what you  
13          see presented on the screen here and in Table 1  
14          of -- of the handout. Clearly this person had  
15          a fairly high amount of uranium excretion over  
16          a decade period. This is actually Mallinckrodt  
17          data. It's -- I'm wary of using hypothetical  
18          data anymore so this is real -- a real worker.  
19          And what you see here is a combination of  
20          fairly large exposures coupled with some non-  
21          detectables, and then some -- you know, much  
22          higher exposures by a factor of five or six,  
23          these 43 picocurie per day intakes. So this  
24          is a mixture of a -- what you might think as a  
25          chronic and acute exposure scenario.

1 I think what we have here is scenario number  
2 one, which is if NIOSH were to take and model  
3 this person's exposure using a complete chronic  
4 exposure sequence. In other words, just assume  
5 he was chronically exposed from day one, and  
6 you see the fit curve through the -- through  
7 the analyses. And that -- that results in a --  
8 an intake of 1.94 time ten to the seventh  
9 picocuries of uranium. Now that's ignoring all  
10 of those acute intakes that occurred that are  
11 above that line -- it doesn't ignore them, it  
12 just -- it just does not model them explicitly.  
13 And I think what you'll see is as you try -- as  
14 you go closer and closer to reality in modeling  
15 this person's intake -- I won't -- don't want  
16 to give away the story here, but the intakes  
17 actually drop as you start getting closer to  
18 reality. Maybe Dave won't have to talk. I'm  
19 doing pretty good so far.

20 **MR. ALLEN:** (Unintelligible)

21 **DR. NETON:** He'll be the judge of that. He'll  
22 answer any of the questions after I muddle the  
23 works here. Oop, I skipped a scenario.  
24 All right, scenario number two is an -- is the  
25 same urine data where we've said okay, well,

1           what if we do model one of these acutes  
2           specifically -- or explicitly, and I think this  
3           scenario included an intake on January 15th,  
4           1950, which is the mid-point between the  
5           highest sample on June 6th and the previous  
6           sample, so you'll see that here graphically  
7           depicted, the high spike that goes off the  
8           scale what the predicted excretion value would  
9           be. But we've added -- Dave has added one  
10          acute intake into this chronic exposure  
11          scenario to model the worker's case. And what  
12          you end up seeing here is the intake is 1. --  
13          about 1.8 times ten to the seventh picocuries  
14          lower than what you'd expect just using a  
15          chronic model.

16          Okay, chronic intake number three -- or number  
17          three was the same -- and by the way, these all  
18          assume a chronic intake, and then we're adding  
19          in acute intakes on top of that. So intake  
20          scenario number three, we have a chronic  
21          intake, but we also had an acute intake -- I  
22          think it was -- was it on the first day of  
23          employment, Dave, or --

24          **MR. ALLEN:** (Off microphone) Halfway between  
25          the start of employment and the first sample.

1           **DR. NETON:** Okay, so halfway, which is the  
2           traditional intake analysis. You pick at the  
3           midpoint and you -- you model it, and what ends  
4           up happening here in scenario three is the dose  
5           -- the intake is 1.4 times ten to the seventh  
6           picocuries per (unintelligible). Remember the  
7           first exposure scenario was 1.9 times ten to  
8           the seventh. These are all variants of ten to  
9           the seventh, I think.

10          Scenario number four says okay, well, there --  
11          there are a lot of datapoints above that  
12          chronic line. Let's model two acute intakes in  
13          here, and you can see that we're starting to  
14          connect the dots more and more, and this is  
15          really the ultimate game of bioassay analysis  
16          intake is to connect the dots and you get the  
17          total intake. As you connect these dots even  
18          more with two modeled explicit intakes, the  
19          intake now projects to 1. -- about 1.3 times  
20          ten to the seventh picocuries, so that's  
21          scenario number four.

22          Scenario number five says let's take the  
23          chronic intake and I think what happened here  
24          is we moved it around to do a little better fit  
25          to some of the data. It's a similar situation,

1 but what you end up with is -- let me see here  
2 -- again, 1.4 times ten to the seventh.  
3 What we're trying to show here is it's fairly  
4 insensitive to how you model these -- these  
5 intakes -- acute intakes in the middle of these  
6 scenarios.  
7 Now number six is a little different. We said  
8 well, what -- what happens if we just throw  
9 these datapoints out? We took the two highest  
10 datapoints that are on this graph here in  
11 scenario six and said they never even occurred;  
12 we didn't even know about them. And then you  
13 fit a chronic intake.  
14 The first intake, the pink graph that you see  
15 on the screen is -- is the first intake that we  
16 got, which is 1.9. You throw those two  
17 datapoints out completely, you end up at about  
18 1.4 picocuries per liter, which is very cons--  
19 1.5 -- not per liter, times ten to the seventh  
20 picocuries, which is not that different from  
21 the intakes when we started to model those  
22 separate acute intakes.  
23 So the whole point of this analysis, and we can  
24 look through it, is -- is the -- this is a  
25 fairly -- the chronic intake scenario that's

1           selected is fairly insensitive to all these  
2           acute intakes that -- that were modeled.  
3           And I think the last part of this presentation  
4           speaks to -- the total intake that you want to  
5           project from a bioassay analysis is really  
6           related to the area under the curve. In other  
7           words, if you collected all -- connected all  
8           the dots of a person's excretion pattern, you  
9           would end up with a unit of picocurie per liter  
10          days, that's the -- an integration of the  
11          entire person's urinary excretion. That's not  
12          exactly what their intake was, but their --  
13          their dose is directly related to how much  
14          uranium they excreted. So the more you connect  
15          the dots, the more accurate picture you get of  
16          that person's intake.

17          When you start using and applying these  
18          chronics that overestimate a lot of points, you  
19          end up over-predicting the intake using the  
20          chronic model -- as in this demonstration --  
21          rather than connecting all the individual dots,  
22          and that's really the point of this Table 2.  
23          It shows as the goodness of fit gets better to  
24          the individual points, the intake goes down --  
25          the projected intake goes down. And that's

1           because these chronic, over-arching values,  
2           these little -- the blips of acutes above the  
3           chronic intakes are not so significant that  
4           they -- they make up massive amounts of extra  
5           dose or -- or intake.

6           I think that's it in a nutshell, Dave.  If  
7           there's anything else you want to say here that  
8           -- that I've missed, then please do.

9           **MR. ALLEN:**  No, you did a good job, Jim.

10          **DR. NETON:**  Thank you.

11          **MR. ALLEN:**  I just wanted -- I think Jim  
12          pointed it out.  I just wanted to basically  
13          reiterate, it's that from all the modeling  
14          we've done so far in this program it just  
15          always seems like the -- the chronic is where  
16          the big bang for the buck is, so to speak.  It  
17          just takes a small change in the chronic intake  
18          rate and you're essentially multiplying it by  
19          thousands of days 'cause we're modeling  
20          careers.  So even a small change in the chronic  
21          intake rate can make a large difference in the  
22          dose.  Any time you add an acute intake or an  
23          assumption to modeling the urinalysis, that  
24          chronic intake rate drops.  And even a small  
25          drop can make a huge difference in the total

1 dose that this person's getting.

2 **DR. NETON:** Right. In other words, there's  
3 competing interests going on here. As you add  
4 acute intakes, the assumed chronic model has to  
5 drop to accommodate the residual excretion from  
6 the acute intake and therefore you're  
7 subtracting from your long-term total intake by  
8 -- by explicitly adding these chronics. So  
9 it's been our experience, and Dave summarized  
10 it well, that the -- it really is -- at the end  
11 of the day, the chronic models are -- and I  
12 think most dosimetrists that you'll talk to  
13 that do this on a day-to-day basis would agree  
14 with that.

15 **DR. MAURO:** Jim, I have a question, and this is  
16 -- when we're in a situation like this I'd like  
17 to sort -- I take my hat off and say -- and  
18 just step away from our roles and ask ourselves  
19 a question. This is certainly a very  
20 compelling argument. There's no doubt about  
21 it, the example you have here. And I like to  
22 ask the question that says well, are there  
23 certain circumstances where we could be  
24 surprised. In other words, certainly in this  
25 example, bulletproof.

1           But as -- let's say a person's sort of  
2           exploring the idea of (unintelligible) IMBA and  
3           dealing with the real world of people who get  
4           exposed to different radionuclides and using  
5           the bioassay data, are there circumstances that  
6           you -- you -- you folks as experts and they say  
7           well, you know, there are certain circumstances  
8           where spikes could really result in a surprise  
9           and we'd better watch out -- 'cause I don't  
10          know of any, but I was wondering if you folks  
11          have any thoughts on that.

12         **DR. NETON:** You know, certainly, you can always  
13          be surprised. I mean Dave -- Dave might be  
14          able -- he's done a lot more cases than I have,  
15          but you can be surprised. I think, you know,  
16          we need to look at the totality of the picture  
17          here. I mean we're talking about a case file,  
18          a worker with bioassay. We -- we've done some  
19          interviews. Could there have been an intake of  
20          -- an acute intake of sufficient magnitude to  
21          completely rock this whole premise and -- and  
22          make it errant -- I've tried to do that. I  
23          tried to think -- and this is -- I got together  
24          with Dave. I tried coming up with my own  
25          scenarios. One could come up with these in

1 scenarios, but they're extremely implausible.  
2 You end up having -- let's say, for instance,  
3 we were just showing ten to the seventh, ten to  
4 the sixth picocurie per year intakes from a  
5 chronic model. That's microcuries per year  
6 intakes, huge. For one then to speculate that  
7 there may have been a -- an -- a couple acute  
8 exposure scenarios that would completely negate  
9 that analysis is pretty hard to project. You  
10 know, you would -- for uranium, for example,  
11 you would have to get into hundreds of MAC air  
12 for a very extended period of time, which at  
13 some point I'd argue would become chronic. But  
14 to have like a one-hour -- what -- what you  
15 hear anecdotally from workers a lot is there  
16 was an incident that -- and I left the area.  
17 Well, there you're talking about a one, maybe  
18 two, three-hour exposure. It would have had to  
19 have been -- in relation to this ten to the  
20 fifth, ten to the sixth, ten to the seventh  
21 picocurie intake -- somewhere close to that to  
22 even make it -- a huge difference, and we've  
23 already demonstrated that even that in itself  
24 would bring the chronic model down. So I -- I  
25 think it's hard -- it's hard to come up with,

1 but never say never. I mean I'm sure one could  
2 -- could finagle some calculation that would --  
3 would maybe show this is not perfect, but I --  
4 I think it's -- it's reasonable. I think  
5 that's as far as I can go.

6 **DR. MAURO:** Thank you.

7 **DR. LIPSZTEIN:** (Unintelligible) I didn't hear  
8 everything.

9 **DR. NETON:** Uh-huh.

10 **DR. LIPSZTEIN:** (Unintelligible)

11 **MR. ALLEN:** What we're saying is if you assume  
12 there was no acute intake and you model the  
13 urinalysis as if it was a chronic, then that  
14 chronic ends up being increased because of the  
15 -- any samples that were taken after that acute  
16 in that chronic modeling ends up giving you  
17 more total dose than if you realized you had an  
18 acute intake and you modeled that in there with  
19 it -- in general. There --

20 **DR. LIPSZTEIN:** (Unintelligible) modeling the  
21 results (unintelligible) intake  
22 (unintelligible)?

23 **MR. ALLEN:** We're modeling the samples as if it  
24 was a constant chronic.

25 **DR. LIPSZTEIN:** (Unintelligible) lower

1 (unintelligible) and after (unintelligible)?  
2 **MR. ALLEN:** Well, the example on the -- on the  
3 -- I know you can't see it, Joyce, but the  
4 example here is basically the individual's  
5 urinalysis for his whole career, and we simply  
6 threw a chronic intake over his entire career.  
7 Some of those spikes are -- are most definitely  
8 a chronic -- or I'm sorry, an acute type of  
9 intake but we just modeled it as a chronic.  
10 Then we started to get a little more exact on  
11 this individual and modeled some of these  
12 acutes along with an underlying chronic for his  
13 career, and as we modeled these acutes the  
14 chronic drops because the chronic was driven by  
15 all the samples. And now when you throw some  
16 acutes in there, the chronic is driven by the -  
17 - the lower samples. So with the chronic  
18 dropping and multiplying that by an entire  
19 career, in this case over 4,000 days, you end  
20 up subtracting quite a bit just by adding in  
21 the acutes. It's kind of counter-intuitive.  
22 And in general what we've seen before is the  
23 more exact you get in your fitting, the closer  
24 you get to connecting the dots, the -- the  
25 lower it's going to get compared to just

1 modeling the entire career as a chronic. It's  
2 something that's easier to show than to  
3 demonstrate empirically.

4 **DR. LIPSZTEIN:** (Unintelligible) you have to  
5 (unintelligible).

6 **DR. NETON:** Sorry, I missed your last sentence  
7 there, Joyce.

8 **DR. LIPSZTEIN:** (Unintelligible) I'm saying  
9 that (unintelligible).

10 **DR. NETON:** Yeah, and that's what we're saying.

11 **DR. LIPSZTEIN:** (Unintelligible) not sure  
12 (unintelligible).

13 **DR. NETON:** Okay. Okay. Boy, does that mean  
14 we're down to number five?

15 **MR. GRIFFON:** I think we're down to number  
16 five, yeah.

17 **DR. NETON:** Wow.

18 **UNIDENTIFIED:** (Unintelligible)

19 **DR. NETON:** That was -- oh, four, is there  
20 another part of four? No, that was done, four.  
21 Okay, number five, (unintelligible) of dose for  
22 unmonitored workers. Okay, this -- this is  
23 related to the site profile evaluation that --  
24 that SC&A did where there was some data that  
25 indicated there were environmental releases of

1 at least uranium out the stack. And we -- we  
2 went back and did locate the -- the report,  
3 it's a couple of pages of data that were not  
4 air sample data but were stack emissions, I  
5 believe. And, you know, like most facilities -  
6 - especially uranium facilities -- there are  
7 stack emissions and so then the question is do  
8 we assign nothing to people who were not  
9 monitored, or what do we assign them.

10 And we've looked at that and in discussing this  
11 among ourselves, we believe that it's going to  
12 be unlikely that we can assign zero dose to  
13 anybody. I mean many people walked through the  
14 plants. They -- they frequented areas, the  
15 controls were not as good, so -- I'm stretching  
16 here because I forgot exactly what our position  
17 was. I think that we're -- it's -- it's in the  
18 document that we provided, but I believe that  
19 we're going to provide the distribution of --  
20 of exposures for the workers to the unmonitored  
21 workers. Is that right, Cindy? Is that what  
22 we came to that con-- that would be our -- the  
23 distribution itself, because we just don't --

24 **MR. GRIFFON:** Instead of the 95th. Right?

25 **DR. NETON:** Instead of the 95th. We just don't

1 know. We just really don't know in a  
2 particular -- a person could be recorded as a  
3 secretary one day, but then have an unmonitored  
4 period somewhere else and you wouldn't -- an  
5 unrecorded -- you wouldn't be able to  
6 definitively at least defend what we've done,  
7 so we're proposing the best we're going to be  
8 able to do, we believe, here is to assign the  
9 distribution for the doses for the facility.

10 **MR. GRIFFON:** Did -- did you -- did you in any  
11 way consider that proposal against some of the  
12 environmental data that Arjun was discussing  
13 and whether the --

14 **DR. NETON:** Right.

15 **MR. GRIFFON:** -- you can defend the fact that  
16 it --

17 **DR. NETON:** Well --

18 **MR. GRIFFON:** -- be a claimant-favorable  
19 approach compar--

20 **DR. NETON:** Well --

21 **MR. GRIFFON:** -- comparatively? I -- I -- it  
22 seems like if --

23 **DR. NETON:** You know, we haven't done that  
24 definitively, Mark. I think you raise a good  
25 point. We probably need to do that, although

1 we have stack emission data and it's hard for  
2 us to imagine that the stack releases would  
3 result in higher doses walking about the site  
4 than some of these process air -- you know,  
5 data -- intakes that we're projecting based on  
6 working with the raw material itself. But we -  
7 - you're right --

8 **MR. GRIFFON:** (Off microphone) (Unintelligible)  
9 Arjun (unintelligible).

10 **DR. MAKHIJANI:** I -- again, I did a little  
11 back-of-the-envelope check because the  
12 Mallinckrodt situation was a little bit  
13 different than many facilities or the normal  
14 stack dispersion modeling that you would do  
15 because you've got lots and lots of buildings,  
16 and pe-- the workers would be -- when they're  
17 outside and therefore susceptible to getting  
18 some dose from the stack releases. They'd --  
19 they'd be near buildings and so you wouldn't be  
20 able to do dispersion modeling. At the  
21 institute where I work, Institute of  
22 (unintelligible) Energy and Environmental  
23 Research, we had -- in the context of a study  
24 we did for assessing doses near a building, we  
25 had actually the thing modeled with the wind --

1 wind tunnel tests that were done with the  
2 building modeled and the stacks and -- and  
3 cons-- and dispersion factors calculated very  
4 nearby for accidents. So if you have an  
5 accidental release that -- you could get pretty  
6 high doses because the dispersion factors are  
7 very large. Our -- the largest wind tunnel  
8 calculated dispersion factor near a production  
9 building -- of course different geometries, you  
10 had more buildings and, you know -- was 3.9  
11 time ten to the minus three seconds per cubic  
12 meter. And if you assume even a small release  
13 of K-65 type material, you have -- I think you  
14 could get pretty significant doses.

15 **DR. NETON:** Right, I guess and that sort of  
16 confirms our -- you know, our wariness of  
17 trying to model these stack emissions and --  
18 and using those to -- to come up with -- with  
19 doses, so I think -- you're right, there could  
20 be high instantaneous concentrations on-site,  
21 but I think if we apply a chronic exposure  
22 model for -- for the year to these people and  
23 use the distribution for the workers -- I'm --  
24 I'm having trouble thinking why that would not  
25 be claimant-favorable.

1           **MR. ALLEN:** I think the examples that Joe Guido  
2 went over earlier demonstrate that the coworker  
3 data is also pretty high and --

4           **DR. NETON:** Right.

5           **MR. ALLEN:** -- I mean when you're talking stack  
6 emissions you're talking about the ventilation  
7 system removing air from these people were  
8 working, so by definition, essentially the  
9 coworker data should be higher than what you  
10 would get outside the building from the  
11 environmental --

12          **DR. NETON:** Well, maybe not.

13          **MR. ALLEN:** -- but it's -- almost by  
14 definition, especially when you talk about over  
15 the -- the entire year versus a -- you know, a  
16 short, episodic event.

17          **DR. MAKHIJANI:** Yeah, I think on the basis of  
18 an annual average and annual average dispersion  
19 factors, I wouldn't -- in a normal situation  
20 with continuous releases, I think that you  
21 would be right. However, we do know that there  
22 are episodic -- I mean even in November, 1984  
23 there was a release of 200 kilograms from  
24 Fernald, and that's what started the whole  
25 argument about, you know, Fernald and its

1 neighbors found out about -- and so on. So  
2 releases of hundreds of kilograms from  
3 Mallinckrodt type of facility in -- as an  
4 episodic release is certainly possible. And  
5 releases of tens of kilograms are certainly  
6 possible when you've got a total source term of  
7 14,000, 15,000 kilograms that's partial because  
8 not all the plants were taken into account in  
9 the one sheet that I found. So I -- I'm happy  
10 to kind of share some of the numbers after my  
11 colleagues have had a chance to look at them  
12 because I kind of, you know, just did a back-  
13 of-the-envelope calculation preparing for this.  
14 But I -- I think -- what goes up the stack and  
15 what's in the workplace are not correlated  
16 because --

17 **MR. ALLEN:** I would agree with you --

18 **DR. MAKHIJANI:** -- in fact they may be anti-  
19 correlated.

20 **MR. ALLEN:** I would agree with you it's  
21 possible to get a higher intake rate outside  
22 the building from some sort of event like that.  
23 But you have to miti-- I mean you're example's  
24 a good example, the 1984 Fernald was actually a  
25 dust collector that released all this up the

1           stack, a dust collector problem. But you've  
2           got to remember, everything that got into that  
3           dust collector came from the work area where  
4           workers were working. It might have taken  
5           months for it to get there and then released in  
6           one shot, but it was -- it came from there. So  
7           the urinalysis from the people working in Plant  
8           -- Plant 9, I believe it was for 1984 -- for  
9           that year or so ahead of time, you know, for  
10          the few months to that event, should be  
11          sampling the same kind of air, just over a  
12          period of time versus an episodic event.

13         **DR. MAKHIJANI:** Actually that's exactly what I  
14         don't agree with because when you have a well-  
15         ventilated workplace, what winds up in the dust  
16         bags is what's not in the work area. Because  
17         if you don't have a well-ventilated workplace  
18         then the workers are breathing it and then it  
19         settles on the plant floor. And of course that  
20         was a problem at Fernald. It was all caked up  
21         and everything. But -- but what com-- what  
22         goes in the dust collectors and the stacks --  
23         so you could have dust collectors that are very  
24         dirty and have a relatively clean workplace,  
25         provided you've got good ventilation. And the

1 two things are not necessarily related.

2 **MR. ALLEN:** But I think from the -- the worker  
3 interviews you talked to, I don't think there  
4 was any hint that there was good ventilation at  
5 Mallinckrodt, that they collected -- collected  
6 all the dust very well.

7 **DR. NETON:** Can't -- can't have it both ways.  
8 But I think -- what I'm hearing you, Arjun --  
9 I'm having trouble grasping this -- is that you  
10 seem to be contending that the 50th percentile,  
11 the average worker assigned intakes, would not  
12 sufficiently bound an unmonitored worker who  
13 was an administrative -- in administrative area  
14 on a full-time basis. Is that what you're  
15 suggesting?

16 **DR. MAKHIJANI:** Well, since we're talking about  
17 Missouri, this is a Show-Me State issue.  
18 Right? So I'm not suggesting that -- that this  
19 is the case. I'm saying if -- it's not a  
20 priori given that what -- I think that -- that  
21 -- that it's important to run some numbers, and  
22 I -- I did some numbers and I was surprised,  
23 and I'm not ready to share them because maybe I  
24 was wrongly surprised. Right? So I mean it's  
25 important to put those numbers on the record,

1           and I just -- and I -- so maybe I'm not quite  
2           right, but I do think that -- that assuming  
3           that coworker data inside the plant covers an  
4           outside accident exposure where you've got lots  
5           of radium, thorium, so on -- I'm not sure. You  
6           may well be right and I'm -- I'm not saying  
7           that -- I think some little bit of work needs  
8           to be done here, and I don't know exactly --

9           **MR. GRIFFON:** I think -- I think that this can  
10          be an off-line discussion --

11          **DR. NETON:** Yeah.

12          **MR. GRIFFON:** -- but I think that we -- I mean  
13          the issue of the environmental samples came up  
14          in our prior discussions, so I think you should  
15          address it head-on and -- and make the case --

16          **DR. NETON:** Right.

17          **MR. GRIFFON:** -- for why this is more -- I tend  
18          to agree with you.

19          **DR. NETON:** Right.

20          **MR. GRIFFON:** I know Arjun has some questions.

21          **DR. NETON:** Right.

22          **MR. GRIFFON:** But I think -- maybe not  
23          quantitatively but at least qualitatively make  
24          a -- make the case.

25          **DR. NETON:** We -- we can do that.

1           **MR. GRIFFON:** Direct-- directly, instead of  
2 saying, you know --

3           **MS. BLOOM:** Well, I think the case is made from  
4 the environmental numbers at the DOE sites  
5 where we do have monitoring and we do have some  
6 DOE sites where we had information in the early  
7 years, and you don't have anywhere near the  
8 intake rates that you're assuming for workers  
9 inside buildings as you do outside buildings.

10          **DR. NETON:** Well, and I also think that Janet  
11 Westbrook indicated in our last call there --  
12 there are a few, albeit small, number of  
13 environmental samples taken in areas where  
14 security guards may have been stationed and  
15 what-not, and we can look at those.

16          **MS. BLOOM:** (Off microphone) We call them  
17 outdoor (unintelligible) samples.

18          **DR. NETON:** Now that would -- those are going  
19 to be small and -- and maybe only cover a few  
20 day periods, but it would certainly indicate  
21 that constant emissions were not well above  
22 that of the average plant that we're assigning.  
23 I mean we're talking intakes of hundreds of  
24 picocuries per day by workers in the plants,  
25 and it would be difficult for me to imagine

1           those values to get higher than that outside  
2           the plant on a -- on a constant basis.  But --  
3           but you're absolutely right.  I mean, you know,  
4           Arjun's a show-me type guy today and I think we  
5           need to -- we need to do our homework and  
6           demonstrate that.

7           **MR. GRIFFON:**  And -- and -- yeah, and I would  
8           also -- I mean I think to the extent you can  
9           use Mallinckrodt-specific data, it would -- it  
10          would be better, right, 'cause we've gone down  
11          that path before, too, but...

12          **UNIDENTIFIED:**  (Off microphone)  
13          (Unintelligible)

14          **MR. GRIFFON:**  Yeah.  Okay, is there anything  
15          else on number five?

16          **DR. NETON:**  I think there are a couple other --  
17          additional points here.  The issue was raised  
18          about the SLAPS workers and -- and we've  
19          investigated that to some extent, and I think I  
20          covered this briefly on our last call.  The  
21          SLAPS workers were not permanently assigned  
22          there, so we would -- we propose to use the  
23          plant data for SLAPS workers, although we do --  
24          are doing some -- some (unintelligible) last-  
25          minute refinements on that.  Cindy has some

1 data on some SLAPS -- air concentration data?

2 **MS. BLOOM:** That's only the radon, we have --

3 **DR. NETON:** The radon issue.

4 **MS. BLOOM:** -- no air concentrations, though.

5 **DR. NETON:** But again, we believe that the

6 SLAPS, being a storage facility and the

7 material was already drummed -- at least for

8 the radium material, the K-65 material -- it

9 appears to us, and we'll do a better job

10 documenting this -- that these SLAPS workers

11 spent a bulk of their time at the plant. This

12 was not a full-time, assigned position. They -

13 - they moved over there, took care of some --

14 whatever activities they needed to, as far as

15 drumming and -- and maintenance --

16 **MS. BLOOM:** They were actually restricted from

17 being there more than a couple hours a week.

18 Certainly by -- I can't remember the exact date

19 when that happened, it was around '49 and '50,

20 where they were --

21 **DR. NETON:** Right, so --

22 **MS. BLOOM:** -- '48 to '50 where they were

23 changing the requirements, so...

24 **DR. NETON:** We -- we will have a little better

25 detail on the SLAPS workers 'cause they don't

1 necessarily fit into this unmonitored,  
2 secretarial/maintenance type -- type workers.

3 **MS. BLOOM:** For the -- for the intakes, those  
4 workers are monitored. I mean we -- you have  
5 monitoring data. They -- they're included in  
6 that population of coworkers.

7 **DR. NETON:** That is true.

8 **MR. GRIFFON:** All right. Anything else on  
9 number five?

10 (No responses)

11 You want to do another presentation of the  
12 cases? No, I was just kidding.

13 **DR. NETON:** I'm ready if you are.

14 **MR. GRIFFON:** How about some new cases? No...  
15 Okay, I was just going to try to summarize a  
16 couple of things that -- that are going to  
17 happen in the next week or so as far as follow-  
18 up items, and here what I had and maybe we can  
19 just flesh out the final -- I think there's  
20 only actually a few issues that we really need  
21 to -- to hone in on.

22 One was the issue that we just discussed, the  
23 environ-- you know, the justification for the -  
24 - for not using the environmental data for  
25 those that were outside the plant.

1           The second one that I had is an outline of the  
2           approach -- or I guess a -- the argument that  
3           the radon breath data will actually bound the  
4           radon exposures, as well. It'll be a bounding  
5           factor, the argument that Dave made earlier.  
6           The third item, which I think is the most  
7           critical item -- in my eyes, anyway -- is the --  
8           -- the thorium question as Jim has been  
9           describing it and the -- the approach that  
10          you're going to use to bound I guess the  
11          thorium, actinium and protactinium, but -- and  
12          whether those -- whether those ratios --

13         **DR. NETON:** Right.

14         **MR. GRIFFON:** -- have to be adjusted or how --  
15         yeah, so...

16         And I don't know, I might have missed -- are  
17         there other issues on the table?

18         **DR. WADE:** You might put one -- and this goes  
19         back to Denise's issue as to the policy  
20         question as to an SEC process versus a site  
21         profile process. That's an issue that really  
22         NIOSH has to take up, and then the Board will  
23         have to take up, but I think that's a major  
24         issue for us to address leaving this meeting.

25         **MR. GRIFFON:** I agree, yeah, yeah.

1           **MS. BROCK:** (Off microphone) (Unintelligible)

2           **DR. WADE:** We'll discuss it leading up to the  
3 August meeting and then at the August meeting  
4 NIOSH will have to either present the  
5 supplement to the SEC report or not, and then  
6 the Board will have to deliberate based upon  
7 what NIOSH presents, as well as this working  
8 group reporting now. So I think that's the  
9 process we'll follow.

10          **MR. GRIFFON:** All right. Arjun.

11          **DR. MAKHIJANI:** Mark, was there anything to be  
12 done on the missing radon breath data?

13          **MR. GRIFFON:** Oh, I did -- yes, thank you. I -  
14 - I would like -- and I don't know if this is  
15 possible, but I still have that issue of the 25  
16 to 30 percent either not analyzed or lost  
17 datapoints. And it -- it goes to the  
18 reliability of the breath radon data and -- and  
19 I don't know if there's any documentation in  
20 the HASL literature that might give us a good  
21 reason why -- why those samples were, you know,  
22 quote/unquote, lost or -- and I -- and I agree,  
23 it might be a lost in processing kind of thing.

24          **DR. NETON:** Yeah, we'll certainly look -- look  
25 into that. I think -- now you're saying that

1           these were indicated as missing or lost on the  
2           HASL analysis sheets?

3           **MR. GRIFFON:** Uh-huh, yes.

4           **DR. NETON:** Okay. There's a few things we  
5           could -- I could think of to try to do to give  
6           you some comfort. I think, you know, looking  
7           at possibly the -- if we -- if we could find  
8           the job categories of the workers and -- which  
9           were lost and to -- to get a feel that those  
10          are no different than the ones where we have  
11          samples for -- you know, that kind of thing --

12          **MR. GRIFFON:** Right, right, right.

13          **DR. NETON:** -- that there was no selective --

14          **MR. GRIFFON:** That's --

15          **DR. NETON:** -- censoring of the information,  
16          that sort of thing (unintelligible) --

17          **MR. GRIFFON:** And I should say I did a  
18          preliminary look at this and it -- there don't  
19          -- there don't appear to be any trends --

20          **DR. NETON:** Right.

21          **MR. GRIFFON:** -- but that might be something to  
22          look at, are --

23          **DR. NETON:** I think that's what we would look  
24          at --

25          **MR. GRIFFON:** -- are there trends by job titles

1 (unintelligible) --

2 **DR. NETON:** -- 'cause really --

3 **MR. GRIFFON:** -- something like that --

4 **DR. NETON:** -- really then what we have is more  
5 of a truncated dataset, not many as numbers,  
6 but -- but what we have are -- we would -- we  
7 could demonstrate possibly that they are not  
8 that different than the distribution of the  
9 ones that were missing, you know.

10 **MR. GRIFFON:** Right.

11 **DR. NETON:** But let's say if we came up with  
12 some -- some job category that was just  
13 selectively gone, we may -- it may cause --

14 **MR. GRIFFON:** Exactly, or --

15 **DR. NETON:** -- cause reason for concern.

16 **MR. GRIFFON:** Right. And I didn't see that,  
17 but I -- yeah, I would ask for a little follow-  
18 up on that.

19 **DR. NETON:** We'll do a follow-up on that.

20 **MR. GRIFFON:** Okay. I think -- anybody have  
21 anything else that I missed that we --

22 **DR. NETON:** No, that's enough.

23 **MR. GRIFFON:** -- we agreed to do? Denise has  
24 something else.

25 **MS. BROCK:** I just wanted to maybe ask a couple

1 of questions, if I could, and perhaps read  
2 something from the document that NIOSH had come  
3 up with, I think it was like the '75 -- yes --  
4 notes and summary, a visit by Mont Mason -- or  
5 I mean Mason, August, 1975. And I don't know  
6 if this actually is relevant, but I -- I found  
7 it interesting. It was page 13 and it says  
8 number two, I quote, (reading) Exposure to  
9 radon in the work space air. There are  
10 fragmentary measurements of air radon beginning  
11 about 1946 and continuing through about 1955.  
12 I view them as having little if any use as a  
13 measure of the magnitude of individual  
14 exposure. These data can be used to show that  
15 certain jobs or job categories did entail  
16 possible exposure to radon within a  
17 (unintelligible) range. Any interpretation  
18 beyond that would be erroneous, in my opinion.  
19 I've done nothing to date to organize air radon  
20 data for the purpose of entering it into the  
21 exposure history as a job stress. Note, these  
22 have been taped for future reference. In  
23 general the air concentrations did not exceed  
24 the range of 0.1 to 0.1 times ten to minus ten  
25 Curies per liter of air. Although a few spots

1           were chronically in the 1.0 to 10.0 range from  
2           1946 to 1949, occasionally single samples  
3           exceeded 100 times ten minus ten Curie per  
4           liter.

5           I really don't know what that means, I just  
6           thought it was interesting and I don't know if  
7           that has to do with the surrounding air -- I'm  
8           assuming that's what that means. Oh, I'm  
9           learning, that's great.

10          And the other thing I wanted to ask is in  
11          reference to the cases that have already been  
12          dosed and denied because, if I understand  
13          correctly, the methodology of dose  
14          reconstruction, if I'm understanding correctly,  
15          has changed now, I would assume that the dose  
16          reconstructions that have been denied will now  
17          be pulled back in for redose. Is that correct?

18          **DR. NETON:** If these approaches are adopted,  
19          that is true. Dave Allen has some words of  
20          wisdom.

21          **MR. ALLEN:** Before you commit to something  
22          there.

23          **DR. NETON:** Okay.

24          **MR. ALLEN:** We've said all along that the TBDs  
25          are living documents and there's been minor

1 changes to other TBDs, and our standard  
2 approach has been to write a -- an evaluation  
3 report. Essentially we're committed to  
4 evaluate, which I think is what you want, the  
5 previously done ones. But we're not  
6 necessarily committed to opening it back up.  
7 The last thing we want to do is to take  
8 somebody who's been denied, tell them we're  
9 going to redo their dose reconstruction, then  
10 deny them again. So --

11 **MS. BROCK:** Absolutely. I just want to make  
12 sure that the opportunity is there for that to  
13 be -- if this is adopted, that that -- that  
14 that would possibly be looked at again. I mean  
15 --

16 **DR. NETON:** That's --

17 **MS. BROCK:** -- I never --

18 **MR. ALLEN:** Again --

19 **MS. BROCK:** -- want to give anybody false hope,  
20 but if there's been a mistake and -- not even a  
21 mistake, but if there's another methodology  
22 that would allow them to come at a higher POC,  
23 absolutely I would like for that --

24 **DR. NETON:** Right.

25 **MS. BROCK:** -- to --

1           **MR. ALLEN:** Yeah, and it very --

2           **MS. BROCK:** -- to happen.

3           **MR. ALLEN:** Our standard approach is to re-  
4 evaluate when there's a change, but not  
5 necessarily to open it up or even tell the  
6 claimant about it.

7           **MS. BROCK:** Oh, okay.

8           **MR. ALLEN:** Like you say, we don't --

9           **MS. BROCK:** Right.

10          **MR. ALLEN:** -- want to do the false hope thing.

11          **MS. BROCK:** Okay. And another thing I'd like  
12 to ask, I have -- and I think we've maybe  
13 discussed this before. I have obviously  
14 certain claimants -- workers, that are in very  
15 poor condition and I would hope that possibly  
16 those could be expedited, as well. I'm  
17 assuming that NIOSH is moving quite  
18 expeditiously on a lot of these, so I'm hoping  
19 that maybe if -- if you know or somebody from  
20 ORAU would know that maybe somebody's not doing  
21 real well, that they would be gracious enough  
22 to maybe, if they could, push those ahead.

23          **DR. NETON:** Well, our standard approach here is  
24 to do dose reconstructions for the oldest  
25 claims in our possession first. I mean those

1           are -- it's a first in, first out type of  
2           approach. Right now we're working on the  
3           backlog of the first 5,000 cases, so any lower  
4           numbered cases would be given priority at this  
5           time. That's -- that's our approach.

6           **MS. BROCK:** Okay. And I -- I know I had one  
7           more. For some reason, I wrote a note and I --  
8           I can't find it.

9           **MR. GRIFFON:** I think the -- to speak to your  
10          first question, I think Dave's analysis might  
11          address some of that concern over the radon  
12          data because it sounds like you're not  
13          (unintelligible) -- you may not end up  
14          assigning radon doses. Right?

15          **DR. NETON:** Right, but I think what -- what  
16          Mont -- the Mont Mason reference that Denise  
17          was referring -- to which she was referring is  
18          really the radon in air concentration data.

19          **MR. GRIFFON:** Right, that's --

20          **DR. NETON:** Oh, I see what you're saying is the  
21          radon breath would bound -- possibly bound  
22          those exposures. I think what Mont Mason was  
23          talking there is the ability to give  
24          individually-assigned radon doses would be  
25          unlikely, and it's -- that's -- that's why you

1 see us adopting the 95th percentile approach.  
2 And in his little statement there he even  
3 acknowledges that we -- one can put maximum  
4 values on these things, but you'll -- it is  
5 very difficult to go and assign Worker A X  
6 radon exposure, but we do know what the  
7 distribution was and we would assign the upper  
8 end of it, lacking any specific information.

9 **MR. GRIFFON:** (Off microphone) But it may all  
10 be moot (unintelligible).

11 **DR. NETON:** And Dave's technique may actually  
12 end up --

13 **MR. ALLEN:** (Off microphone) For systemic  
14 (unintelligible) --

15 **DR. NETON:** For systemic organs. In fact, as  
16 we've indicated previously, the lung cancer  
17 cases that we've analyzed --

18 **MR. GRIFFON:** Right, that's --

19 **DR. NETON:** -- to date have been over 50  
20 percent by Department of Labor, so adding  
21 additional radon doses is not really critical.

22 **MS. BROCK:** And I have one more statement to --  
23 oh, I'm sorry, Arjun. One more statement about  
24 the unmonitored workers. I just know from my  
25 experience with some of the workers that I

1 speak with, or maybe even some of the spouses  
2 of these workers, that sometimes the job title  
3 does not always match the job description. For  
4 example, I had a gentleman that was called a --  
5 an -- like an office boy or mail clerk, and  
6 part of his job description or part of what he  
7 did was to actually take open containers -- now  
8 I don't know if that was liquid or sol-- I  
9 don't have any idea, but he would transport  
10 this waste back and forth from downtown to  
11 maybe -- I think SLAPS and just back and forth.  
12 I don't know that this person was monitored.  
13 The case has been denied. The gentleman had a  
14 glioblastoma. I haven't got a chance to look  
15 completely at the dose reconstruction myself.  
16 I don't know if his actual records were used,  
17 if they were -- if there were actual dose  
18 records or if that was coworker data. But as  
19 you read through that -- and again, it puts a  
20 spouse at a disadvantage, too, because they're  
21 just not really sure what all that job  
22 entailed.

23 Another thing that I would like to talk about  
24 is a particular claimant that has recently been  
25 denied. She was a secretary, had a double

1           masectomy (sic), worked downtown St. Louis and  
2           also at Weldon Spring and she actually was  
3           within the plant. Now I don't know which plant  
4           it was, whether it was Destrehan or Weldon  
5           Spring, but she was actually in the plant area.  
6           Through the phone interview there was  
7           discussion about of course the dust being all  
8           over the paperwork and the desk and the floor,  
9           stockings coming off her legs -- which I'm  
10          assuming maybe have been acid -- but I'm  
11          wondering if in fact that's all taken into  
12          consideration. And I wonder if someone like  
13          that, if they're within that facility and  
14          there's -- in the dose reconstruction report it  
15          actually states that she had exposure to  
16          thorium and radon, and even though that case  
17          has been denied, I -- I wonder if that would  
18          possibly change the numbers on that.

19          **DR. NETON:** That's difficult to tell. I mean  
20          we can't envision, you know, what the -- what  
21          the do-- without looking at the dose  
22          reconstruction there's no way that we could  
23          really make a judgment --

24          **MS. BROCK:** Got it right here. You want to see  
25          it?

1           **DR. NETON:** Not -- not during this meeting, but  
2           maybe after this meeting we can sit down --

3           **MS. BROCK:** Okay.

4           **DR. NETON:** -- and look at it.

5           **MR. GRIFFON:** Okay. All right, Arjun.

6           **DR. MAKHIJANI:** Just a brief follow-up on what  
7           Denise just said -- or a little bit earlier.  
8           There are a few measurements of like ten to the  
9           minus eight picocuries per liter. Are they --  
10          are they in your distribution, all of -- and  
11          how do you deal with that and to -- ten to the  
12          minus eight seems -- it jogged my memory 'cause  
13          I'd seen those numbers and I'd forgotten about  
14          them.

15          **MS. BLOOM:** We do --

16          **DR. MAKHIJANI:** That's a pretty huge radon  
17          concentration.

18          **MS. BLOOM:** It is a huge radon concentration.  
19          Those were usually measured either at SLAPS or  
20          in the scale house or in the ore house. Some  
21          of it's associated with opening drums. There  
22          was also a drying oven, I think -- a drying  
23          furnace, I believe, that sometimes had high  
24          values. For Mallinckrodt they don't actually  
25          have -- I didn't see very man-- I think one --

1           one boxcar measurement, but I know from looking  
2           at other sites that those can be very high, the  
3           radon concentrations can be very high in the  
4           boxcars when they're first opened up.

5           **DR. MAURO:** Along those lines, one of the  
6           interesting things I've run across with I work  
7           with these statistics, sometimes the average  
8           actually is higher than the 95th percentile  
9           when you're -- I've seen distri--

10          **UNIDENTIFIED:** (Off microphone)

11          (Unintelligible)

12          **DR. MAURO:** Yeah, when -- no, and the only  
13          reason it's triggered is because -- see, we're  
14          talking about numbers on the order of 100  
15          picocuries per liter, maybe 1,000. Now ten to  
16          the minus eighth is 100,000 or -- 10,000  
17          picocuries per liter. Right? So where -- what  
18          we're talking about is --

19          **MS. BLOOM:** (Off microphone) 1,000

20          (unintelligible).

21          **DR. MAURO:** Well, it's ten to the minus 12?

22          **MS. BLOOM:** (Unintelligible) Oh, no, I'm sorry,  
23          ten to the minus eight --

24          **DR. MAURO:** 10,000.

25          **MS. BLOOM:** I'm sorry, I haven't seen them that

1 high. I've seen 2,000.

2 **DR. MAURO:** 'Cause I've seen ten to the minus  
3 eight in one of --

4 **MS. BLOOM:** Yeah.

5 **DR. MAURO:** -- your reports. Now it might have  
6 been just one reading. I just rai-- triggered  
7 because I've seen the situation arise. When  
8 you have a distribution and you have a couple  
9 of really big outliers, even individual values,  
10 that -- what that does is it drives the average  
11 all the way off the scale, and it's higher than  
12 your 95th percentile.

13 **DR. NETON:** Right.

14 **DR. MAURO:** I'm not quite sure, what do you do  
15 with that?

16 **DR. NETON:** Well, and one needs to look at  
17 those huge, huge values and determine whether  
18 they're relevant for -- for continuous exposure  
19 scenarios or not. I mean that -- that's -- I  
20 think we have to apply some reasonableness here  
21 to those values. And if they are, if there was  
22 positions like that, then you're right, but the  
23 likelihood of anyone being in a furnace --  
24 drying over for 2,000 hours -- who knows.

25 **DR. MAKHIJANI:** Yeah, but this -- this is the

1 kind -- you know, rail cars, opening drums,  
2 there would be episodic exposures, but frequent  
3 for the people who were doing that job,  
4 presumably. I mean I don't know, because if  
5 they were that high, then -- and radon breath  
6 is only being taken once every six or eight  
7 months -- sorry -- then -- then this whole  
8 systemic radon thing -- you wouldn't catch  
9 that.

10 **MS. BLOOM:** They -- there -- I misspoke, I -- I  
11 did the math wrong in my head. The highest  
12 results I've seen are 2,000 picocuries per  
13 liter, and that's looking at 1949 forward,  
14 which is the period we're talking about. The  
15 other part is that if you're having radon  
16 concentrations that high, the gamma exposure  
17 rates are huge, and so these workers were  
18 restricted from being in those areas for any  
19 length of time because they were concerned  
20 about going over tolerance levels. So there --  
21 they were -- the occupancy factors need to play  
22 into that, as well.

23 **DR. NETON:** And we also need to look -- you  
24 just jogged my memory, this ten to the minus  
25 eight may be pre-1949 data. I don't know.

1           **MR. GRIFFON:** (Off microphone) Denise, you have  
2           (unintelligible)?

3           **MS. BROCK:** Yes, I do. As far as the workers  
4           being restricted, that may have been what  
5           should have happened, but when I talk to the  
6           workers, that's not exactly what happened.  
7           There were many times when these workers were  
8           basically put in these positions and had to  
9           finish what they were doing, no matter how long  
10          it took. And by the own admission of the AEC  
11          or the AE standards, I think sometimes we're  
12          talking about 15 rem to the lung, and that's  
13          different than the radon exposure, but they  
14          were actually letting these people get way  
15          beyond that, way beyond that before they'd ever  
16          even pull them out, but some of them were 600  
17          to 1,000 rem to the lung. So I don't  
18          necessarily believe that, just because they  
19          should have been restricted, they necessarily  
20          were.

21          **MS. BLOOM:** And I certainly agree with that,  
22          but I think we're looking at the -- the total  
23          program to see what was going on there, and we  
24          are looking at external doses, as well. And I  
25          think for the most part, if they -- and I've

1 read a lot of correspondence for Mallinckrodt  
2 on that that indicates that, you know, they  
3 might have worked -- if they were only supposed  
4 to work two hours, maybe they did work four  
5 hours to finish the job. But on the other  
6 hand, when we're going to apply this data,  
7 we're going to do that in a -- you know, in a  
8 claimant-favorable way.

9 **MS. BROCK:** (Off microphone) (Unintelligible)

10 **MR. GRIFFON:** Go ahead, that's --

11 **MS. BROCK:** I promise this is my last one. I  
12 want to know if -- because this -- and this is  
13 a policy question. If in fact, due to all of  
14 the -- the new things that have arisen, will  
15 the Board and NIOSH be able to come -- come to  
16 a conclusion whether or not this set of workers  
17 in this second part of this SEC will be able to  
18 be dose reconstructed? Will you know that by  
19 the next Board meeting, or does this -- is this  
20 going to require additional research? I mean -  
21 - and as far as the policy question, I know Dr.  
22 Wade said that it will be discussed whether or  
23 not this can even be adopted. Will I be  
24 informed prior to the meeting as far as the  
25 issue of whether it's adopted, and then by the

1 next Board meeting I guess I'm asking if in  
2 fact there will be a decision made.

3 **DR. WADE:** Well, you asked the hard questions.  
4 Certainly you'll be informed if NIOSH is going  
5 to submit a supplement to the SEC evaluation  
6 report. You would be informed of that. And as  
7 a courtesy, if we're not, we will call and tell  
8 you that. God knows, Denise, if this issue  
9 will be resolved at the next meeting. I think  
10 it is all of our hope, and I think everyone in  
11 this room is working as hard as they can to  
12 bring this to closure. I don't think there's a  
13 member of the Board that doesn't feel the pain  
14 of the claimants as this process goes on and  
15 they're weighing that pain against the desire  
16 to do a complete job.

17 I think it is all of our expectation -- hope --  
18 that this issue will be resolved. Again, none  
19 of us can say that for sure until it's actually  
20 done and sent on.

21 **MS. BROCK:** I would just like to tell everybody  
22 thank you again for including me and thank you  
23 for all of your hard work. I know it's -- it's  
24 -- it is very hard for everybody involved and I  
25 appreciate it.

1           **DR. WADE:** Thank you.

2           **MR. GRIFFON:** And we've got two weeks. No...  
3 Arjun?

4           **DR. MAKHIJANI:** That's what I was going to say,  
5 we've got -- I've got what, today's August 4th.  
6 I've got 12 days. Right? So really I've got  
7 ten because two days before I have to send it  
8 to Nancy and -- and three days before I have to  
9 send it to John, so I've got nine days. And --  
10 and so these four issues that we've got --

11           **MR. GRIFFON:** Right.

12           **DR. MAKHIJANI:** -- I think obviously have to  
13 have a much closer -- I mean just for my own  
14 sanity, I'd like -- I'd like some -- some idea  
15 of, you know, by when we're going to have some  
16 cutoff date that I can start writing about that  
17 it won't require -- I don't know what the  
18 process is of coming to closure on those four  
19 points, and whether there are going to be any  
20 dates or -- because for me to really do justice  
21 to sending you a report --

22           **MR. GRIFFON:** Right.

23           **DR. MAKHIJANI:** -- by the 16th, I -- I've got  
24 to have the information much earlier.

25           **DR. WADE:** And let's talk through that.

1           **MR. GRIFFON:** Yeah.

2           **DR. WADE:** I mean that -- I want us to talk a  
3           little bit about that, so let me paint a broad  
4           picture, Arjun, of this and then we can maybe  
5           start to get more specific on some of the  
6           issues that remain.

7           I think that what's going to happen starting  
8           now is that you can expect to see from NIOSH  
9           certain augmentation or documentation on  
10          selected issues. We'll go back and talk about  
11          what those are and maybe we can talk about  
12          dates.

13          Then you're going to see a process of dialogue  
14          between SC&A and NIOSH. And this working group  
15          has asked that we encourage a free discussion  
16          between the two parties. We'll try and let the  
17          working group know of those discussions. We'll  
18          certainly let the petitioner know, but we'll in  
19          no way limit the ability of those two groups to  
20          work together to bring this to closure as  
21          quickly as possible.

22          Then we'll be seeing an SC&A report to the  
23          Board on the 16th of August.

24          Then the Board will meet on the 24th and 20--  
25          excuse me, the 25th and 26th. Either in

1           subcommittee or in the full Board meeting the  
2           issue of the Mallinckrodt site profile will be  
3           discussed and the review of that site profile.  
4           Then in a full Board action the Board will take  
5           up the issue of the Mallinckrodt SEC petition.  
6           And as we said earlier, hopefully we'll bring  
7           that to closure.

8           So those are how things will -- will play out  
9           in the long term. Let's try and deal with  
10          Arjun's issue of timing on a -- on a case-by-  
11          case, and let me start with the issue of -- of  
12          radon breath bounding radon exposures. And  
13          Dave, that's your issue. Let me put you on the  
14          spot. When might these fine people have  
15          something to -- to discuss with you?

16          **MR. ALLEN:** I'm --

17          **UNIDENTIFIED:** (Off microphone)

18          (Unintelligible)

19          **MR. ALLEN:** Yeah, thanks. I'm thinking early -  
20          - well, I'm thinking next week, that it might  
21          be -- the more I've thought about it, the might  
22          -- the best bet might be for me to simply  
23          document a few calculations and then I guess  
24          send it to John Mauro and if I -- if I feel I  
25          can get it documented well enough to put it to

1 bed, and I think I can, then next week at some  
2 point.

3 **UNIDENTIFIED:** (Off microphone) The 11th?  
4 (Unintelligible) the end of next week?

5 **MR. ALLEN:** The earlier, the better.

6 **DR. NETON:** Early next week, he's saying.

7 **MR. ALLEN:** Early next week.

8 **MR. GRIFFON:** How about the 9th? That's  
9 Tuesday. Close of business on the 9th? I mean  
10 everything's tight here, so...

11 **MR. ALLEN:** Yeah, I'll commit to that. I'll  
12 commit to something by then.

13 **DR. WADE:** Okay, do the most that you can do.  
14 And I think there's been a good intellectual  
15 agreement reached here. I think this is a  
16 matter of sort of documentation, give and take  
17 and discussion, so let's move on to the next  
18 one.

19 And we sort of categorized this as the thorium  
20 or the ratios kind of issue.

21 **MR. GRIFFON:** Right.

22 **DR. WADE:** Jim, how do you want to proceed with  
23 that?

24 **DR. NETON:** Well, SC&A colleagues are going to  
25 have -- or ORAU colleagues are going to provide

1           some support here on this. I don't want to  
2           speak for their schedules, but I don't see  
3           anything forthcoming until maybe the middle of  
4           next week. Is that reasonable?

5           **MS. BLOOM:** I would say at least the middle of  
6           next week, and it may be toward the end of next  
7           week.

8           **DR. NETON:** That doesn't give you a lot of time  
9           --

10          **MS. BLOOM:** I'm happy to --

11          **DR. NETON:** We'll do what we can do.

12          **MS. BLOOM:** I can give you preliminary  
13          information, but I know you're going to beat me  
14          up on that, so...

15          **UNIDENTIFIED:** (Off microphone)  
16          (Unintelligible)

17          **MR. GRIFFON:** I'm -- I'm hoping also there will  
18          be some phone calls prior to like a -- a  
19          report, so...

20          **DR. NETON:** Well, that's what I'd --

21          **MR. GRIFFON:** Yeah.

22          **DR. NETON:** -- like. I think I'd --

23          **MR. GRIFFON:** Yeah.

24          **DR. NETON:** -- like to engage in some dialogue  
25          earlier in the week --

1           **MR. GRIFFON:** Right.

2           **DR. NETON:** -- as -- as we develop our  
3 positions, rather than throw something over the  
4 bow and then get it back. I think we can sort  
5 of get some tentative feelers out as to where  
6 we're heading and see if that's going to -- I  
7 think some of these dose calculations -- my --  
8 my sense is some of these calculations we've  
9 shown have helped maybe alleviate some of --

10          **MR. GRIFFON:** And --

11          **DR. NETON:** -- the concern, and --

12          **MR. GRIFFON:** And I'd also -- I mean I'd also  
13 maybe recommend that -- that Arjun, you can be  
14 drafting a tentative report while they're --  
15 you know, while you're doing these phone calls,  
16 and -- and -- only to say that, you know, as  
17 you iron out issues, then -- then NIOSH knows  
18 where you're coming from, too, so you can have  
19 these phone calls --

20          **DR. NETON:** I think a report that says we agree  
21 would be very easy to write and very quick --  
22 very -- very quick to produce. I mean I can't  
23 see that to be a very difficult position,  
24 but...

25          **DR. MAKHIJANI:** I'd -- I'd be very happy, but I

1 don't sign blank checks, so...

2 **MR. GRIFFON:** Again -- so you said the 10th on  
3 the -- that issue?

4 **DR. WADE:** Could -- could -- well, let's say a  
5 call -- let's imagine a call on this issue  
6 before the 10th.

7 **DR. MAKHIJANI:** Yes, Dr. Wade, that's what I  
8 was about to suggest is if -- if Cindy could  
9 let me know what the approach is maybe on  
10 Monday as you're writing it or something, I'm -  
11 - I'm not going anywhere from Washington  
12 between now and the 15th, by the time -- by  
13 which I imagine I will be done with this, and  
14 so that I can be looking -- 'cause I really  
15 like Mark's suggestion is that if I can be kind  
16 of writing a re-- drafting a report, and then  
17 all my colleagues -- see, I have to tell my  
18 colleagues what I'm doing and they have to sign  
19 off on it, to do some calculations or  
20 something, so that would be very useful. And  
21 then of course I understand that you could  
22 change your mind -- put different data or  
23 whatever.

24 **MS. BLOOM:** At the last minute. I -- I don't  
25 intend to do that. I do see the beginning of

1           approa-- an approach. I do have more data on  
2           the airport cake, and that's really my first  
3           place to look. I have been working these  
4           issues night and day for the last 14 days, and  
5           I have some personal issues that I have to deal  
6           with, so that's my concern about meeting your  
7           deadline. It's certainly not my goal to impact  
8           your dates, but there's just -- I'll do -- do  
9           it as fast as I can. I'll let you know my  
10          thoughts on it. They -- but actually having  
11          the actual numbers, I think the approach that  
12          we've taken so far is going to be similar to  
13          what I propose, but we will have adjusted  
14          numbers in there based on better data.

15          **DR. WADE:** So a contact early next week.

16          **MS. BLOOM:** Yeah.

17          **DR. WADE:** With the only promise being complete  
18          -- complete and candid disclosure, and then  
19          hopefully a follow-up of information later that  
20          week, but we'll see how that first phone call  
21          goes.

22          **MS. BLOOM:** Correct.

23          **DR. WADE:** Okay.

24          **MS. BLOOM:** Thank you.

25          **DR. WADE:** Thank you. What about the lost data

1 issue, Mark? The lost data issue?

2 **DR. NETON:** I think -- I think this is  
3 something we can address fairly quickly. I  
4 would say early next week we can have something  
5 out. That's a different set of philosophies --

6 **MR. GRIFFON:** August -- August 9th too  
7 (unintelligible) --

8 **DR. NETON:** August 9th I think is fine. You  
9 know, we -- we're not -- we're not creating any  
10 new models here. We're just sort of reviewing  
11 --

12 **MR. GRIFFON:** Just --

13 **DR. NETON:** -- and sort of evaluating.

14 **MR. GRIFFON:** Just for the record, it's not  
15 lost data necessarily, it's just what was  
16 recorded in (unintelligible) --

17 **DR. NETON:** Yeah, missing -- missing -- missing  
18 or lost, yeah. I think we can have some --  
19 some position or some document on that.

20 **DR. WADE:** Okay. And then what I categorize as  
21 the environmental issue?

22 **DR. NETON:** Yeah, that, on the surface, does  
23 not seem to be a real tough problem, but we're  
24 -- we're going to need to -- to -- you know,  
25 there's always surprises when we look at these

1 things, but seems like everything is  
2 gravitating towards the 9th, but can we have  
3 till the 10th on that, just in case we -- we  
4 need an extra day to -- to coordinate the  
5 effort (unintelligible).

6 Okay. Well, that -- that's -- that'll be  
7 interesting. And that gives Arjun an entire  
8 week to generate a report.

9 **MR. GRIFFON:** That says we agree. Right?

10 **DR. NETON:** That says we agree.

11 **MR. GRIFFON:** All right. Lew, did you have any  
12 other closing remarks?

13 **DR. WADE:** Only just to thank everyone for  
14 their -- their effort, and particularly to  
15 thank Denise for her willingness to travel here  
16 and to tolerate our processes. Please  
17 understand that -- that we understand how  
18 important this is to -- to real people who have  
19 given their lives and their health to these  
20 things, but those real people deserve quality  
21 effort on our part and that's what we're trying  
22 to give you.

23 **MS. BROCK:** (Off microphone) (Unintelligible)

24 **MR. GRIFFON:** And I'd like to thank everyone  
25 around the table, too. I know -- and -- and

1           back at the offices. I know a lot of effort  
2           was put into this analysis and I think we're  
3           getting there, so we're really close. And I  
4           think with that -- are we adjourned? We're  
5           adjourned.

6           (Whereupon, the meeting was adjourned.)

7

8

**C E R T I F I C A T E   O F   C O U R T   R E P O R T E R****STATE OF GEORGIA****COUNTY OF FULTON**

I, Steven Ray Green, Certified Merit Court Reporter, do hereby certify that I transcribed the above and foregoing from the day of Aug. 4, 2005; and it is a true and accurate transcript of the testimony captioned herein.

I further certify that I am neither kin nor counsel to any of the parties herein, nor have any interest in the cause named herein.

WITNESS my hand and official seal this the 23<sup>rd</sup> day of August, 2005.

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**STEVEN RAY GREEN, CCR**

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