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

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ADVISORY BOARD ON RADIATION AND
WORKER HEALTH

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SPECIAL EXPOSURE COHORT WORK GROUP

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MONDAY
NOVEMBER 17, 2008

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The work group meeting convened in the Zurich Room of the Cincinnati Airport Marriott Hotel, 2395 Progress Drive, Hebron, Kentucky at 9:30 a.m., Tim Melius, Chairman, presiding.

MEMBERS PRESENT:

JAMES M. MELIUS, Chairman
JOSIE BEACH, Member
MARK GRIFFON, Member
GENEVIEVE S. ROESSLER, Member*
PAUL L. ZIEMER, Member*

ALSO PRESENT:

TED KATZ, Designated Federal Official
HANS BEHLING, SC&A*
ARJUN MAKHIJANI, SC&A
JOHN MAURO, SC&A
STEPHEN OSTROW, SC&A*
JIM NETON, NIOSH OCAS
LARRY ELLIOTT, NIOSH OCAS
LAURIE BREYER, NIOSH OCAS
LAVON RUTHERFORD, NIOSH OCAS
STU HINNEFELD, NIOSH OCAS
DENISE BROCK, NIOSH OD
JOE GUIDO, ORAU
MIKE MAHATHY, ORAU
BILL THURBER, ORAU
ZEDA ELIZABETH HOMOKI-TITUS, HHS
EMILY HOWELL, ESQ., HHS OGC*
DAN McKEEL, Dow, Petitioner*
MAUREEN MERRITT, Participant*
JOHN RAMSPOTT, Participant*
TERRIE BARRIE, ANWAG

Present via telephone.

T A B L E O F C O N T E N T S

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

9:32 a.m.

MR. KATZ: Okay, so we are going to get started. We are missing Mark Griffon but he will be with us shortly. So -- hello?

MS. HOWELL: Sorry, this is Emily. I just wanted to let you know I think there were some airport delays. I know Liz is en route.

MR. KATZ: Oh, okay. Thank you, Emily.

Okay, this is Ted Katz. I'm the acting Designated Federal Official for the Advisory Board on Radiation and Worker Health. And this is the Special Exposure Cohort Workgroup of that board.

And we are going to begin by taking roll starting with the board members in the room.

CHAIR MELIUS: Tim Melius, board member.

MR. KATZ: We need to cover whether

is a conflict of interest with Ames or Dow, which are the two sites that will be discussed at some point during the day.

CHAIR MELIUS: And I have no conflict of interest.

MEMBER BEACH: Josie Beach and no conflict.

MEMBER GRIFFON: Mark Griffon, no conflict.

MR. KATZ: Okay, then on the telephone for Board members.

MEMBER ZIEMER: Paul Ziemer, no conflict.

MEMBER ROESSLER: Gen Roessler, no conflict.

MR. KATZ: Okay. And now NIOSH OCAS OR ORAU staff in the room.

MR. ELLIOTT: Larry Elliott, OCAS, no conflicts.

DR. NETON: Jim Neton, OCAS, no conflict.

MS. BREYER: Laurie Breyer, OCAS,

no conflict.

MR. GUIDO: Joe Guido. I have a conflict with Dow.

MR. KATZ: Okay, conflict with Dow. And on the telephone the NIOSH ORAU staff.

MR. RUTHERFORD: LaVon Rutherford, no conflicts with Dow or Ames.

MS. BROCK: Denise Brock, no conflicts.

MR. KATZ: Okay, that's it for NIOSH ORAU. Then in the room, SC&A.

DR. MAURO: John Mauro, SC&A, no conflict.

DR. MAKHIJANI: Arjun Makhijani, SC&A, no conflict.

MR. KATZ: And on the phone, do we have any SC&A?

MR. BEHLING: Hans Behling, no conflict.

MR. OSTROW: Steve Ostrow, no conflict.

MR. KATZ: Okay, then. And now we

have either representatives of Congressional offices or members of the public on the telephone.

DR. McKEEL: This is Dan McKeel, I'm the SEC petitioner for Dow.

MR. RAMSPOTT: John Ramspott.

MR. KATZ: I'm sorry, that's John Ramspott. Thank you.

MS. BARRIE: And this is Terrie Barrie with ANWAG.

MR. KATZ: Welcome, Terrie.

Anyone else from the public who would like to identify themselves?

(No response.)

*MR. KATZ: Okay, then. Just phone etiquette, please everyone who is not speaking, put your phone on mute. And can you *6 if you don't have a mute button? And please don't put the phone call on hold but hang up and call back in if you need to leave for a while.*

And with that, I turn it over to

the Chair, Dr. Melius.

CHAIR MELIUS: Our plan is to start talking about the 250-day issue with Ames. I suspect we'll go until about eleven o'clock for that.

And then at eleven, we'll switch over to talking about Dow unless we finish up with Ames sooner than that. Or have a very heated discussion that we don't want to stop or whatever.

So -- and I think the last meeting we had about this was -- the discussion was the draft report from SC&A regarding the Ames situation. And then since that time -- since our last, this group we have had the Jim Neton -- NIOSH has produced a report which he circulated again the other day.

And so I think it's probably best to start -- Jim, if you want to briefly summarize.

DR. NETON: Sure.

Yes, this is a report that we -- I

guess we call these white papers these days -- originally circulated April 23rd, 2008, to the working group. And it was our sort of analysis of the 250-day -- I mean the blowout analysis that SC&A prepared and issued in June 2007 and which was primarily put together by Hans.

But I think during our deliberations of this document, a couple questions came to light. One was well, A: does this really apply to anybody currently that we're reconstructing; and then B: SC&A proposed a framework that appeared to be almost workable for doing dose reconstruction.

And I said well, let's take a look at that and see, you know, if we can demonstrate that we can do dose reconstruction for blowouts, then this whole issue may sort of disappear. So this is our attempt at looking at some of those issues.

And there are three parts and I'll go over them one by one. It's pretty brief.

I think this whole document is three pages long.

The first thing we did was we pulled through and, again, I'll have to caveat this by this review was done back in April so the case files we looked at may not be current.

But at that point in time, there were only three case files that we could find at the Ames facility or the Ames laboratory that had less than 250 days of employment and would have been precluded from being in the class.

One of those claims has already been administratively closed by the Department of Labor at the request of the claimant. That leaves two claims which are listed as B and C in this report.

Claim B is active. He worked in the metallurgical lab building purifying some yellow cake, et cetera. But in his caddy, he indicated that he did work with uranium but

not thorium. So it's not clear that this person had any involvement with thorium exposure, particularly blowout, at least directly involved with blowout.

In Claim C, the third claim, the energy employee appears, by looking through the files in some detail, have been a co-op employee who worked part time.

So based on his co-op experience in the laboratory, it looks like if there was any potential for exposure with thorium, it would have been small quantities of sources that might have been present in the laboratory.

So in two out of three cases that we looked at that had less than 250 days employment are sort of on the table for dosing instructions. But it's not clear to us that either of them have potential for exposures to blowouts.

The second part of this review went over SC&A's analysis of a hypothetical blowout. And we did a couple things.

One is we looked at the assumptions behind SC&A's analysis. And I won't go over them in detail here but we believe that it is a reasonable framework for possibly bounding these blowouts.

But we did believe that some of the assumptions used here were somewhat overly conservative. Probably at the high end of what the exposure conditions really were. That's our opinion from looking at some of the assumptions that were made.

We did go and review the calculations and we don't take exception to the doses that were calculated. We believe they are in the general ballpark.

I think we had a five percent here or there discrepancies in the doses but those are trivial for purposes of what we're trying to establish here. And the doses were pretty much in line with what SC&A had calculated for the lung and the bone surfaces. We'll talk about those later.

And the third part of this analysis was that we had suggested that there were bioassay data available for workers at Ames.

There were 73 bioassay regional urine samples that were taken between 52 and 53. And at that meeting, we had suggested that we could go back, use those to try to bound exposures for workers, you know, use those as sort of long-term indicators. And store them as a long-term retention component.

You could take what was currently being excreted in the urine, or at least the misdose that, you know, you could calculate from the urinary excretion and come up with some sort of bounding analysis based on the urine results.

We, in fact, went back and did that but unfortunately the results of our analysis produced implausibly large misdosage. You know, we should have seen a priori that thorium is a very bad nuclide to -- it's not a very particularly useful nuclide for

reconstructing exposures going back in time because not much is excreted in the urine per unit time after it is taken into the body.

And particularly if you go back -- we were going back, I believe, nine months or something trying to predict an acute intake nine months ago based on a contemporary urine sample.

And the doses that we provide in the table clearly are extremely large. I mean the lump doses are somewhere around 8,000 rem, that sort of thing. So that analysis just is not going to work.

So that's the summary, a brief thumbnail summary of what we've got here. Entertain any discussion?

DR. MAKHIJANI: The bottom line is that you do numbers but you come up with implausible numbers.

DR. NETON: Yes, the urine samples just are not going to work. They are not going to be instructive. That still doesn't

mean that the -- you know, the SC&A I think still has some merit.

But the problem with the SC&A approach -- I mean the SC&A originally, I believe, developed this approach to demonstrate that the exposures were substantially large, similar to criticality.

DR. MAKHIJANI: Yes, it wasn't --

DR. NETON: It wasn't supposed to be a bounding thing. But at the same time, given that that scenario is on the table, I still believe that the exposure is somewhere -- maybe not the very high upper end of the exposure but probably no higher than that. But then the question comes up well how many times did that occur.

DR. MAKHIJANI: Right.

DR. NETON: Now you got to also remember though in the 250-day requirement, it's either presence or 250 days. It's not five exposures or five times these blowouts occurred.

DR. MAKHIJANI: Right.

DR. NETON: So in reality, you'd almost have to have a single incident, which would be a single blowout. I mean if you're going to use that blowout as a determining factor in presence.

And then it comes back to where we were at the original meeting, are the doses that are calculated for the single blowout similar to a criticality.

DR. MAKHIJANI: Okay.

DR. NETON: And so we're essentially back to where we were at the last meeting in my opinion.

DR. MAKHIJANI: Yes, I would agree with that. I think that that's sort of the heart of the question. I mean for dose reconstruction, you have to know how many blowouts and so on but it's irrelevant if the focus is on a single incident.

DR. NETON: Right. I mean think that's true. I mean the lawyers are not here

yet.

I think the way the rule is structured, it's either presence, just one incident that you can define or 250 days. There's no in between. You can't start saying well maybe ten days presence or two incidents or that sort of thing.

CHAIR MELIUS: Well but couldn't you say hypothetically 30 days -- if you were present working there for 30 days, there's a strong likelihood that you would have been present during a blowout.

Say we decide -- again, hypothetically, that a single blowout would be, you know, sufficient dose and high enough dose to qualify. That if you were there for, you know, 30 days, you would have, you know, strong probability that you would have been, you know, present -- involved in one of those blowouts. And, therefore, you qualify based on that.

I mean I think that -- it's really

no different than the other -- all the other, you know, estimates that, you know, we do on other dose reconstruction activities.

DR. NETON: I've not really thought about it from that perspective. I don't know about Larry or Emily or Liz, if she gets here have thoughts on that.

But I guess I would go back further and say is that single blowout of sufficient magnitude to be similar to a criticality. I mean that's the first thing I think needs to be established.

DR. MAURO: Yes, I think one of the things we overlooked to step back a bit, one of the first things we did, as a workgroup is explore, you know, what types of doses would one consider to be comparable to a criticality.

And I know we prepared a report on that and we realized that the range was very large. But at the same time, I'd offer up that I think there was consensus that

something on the order of from 25 rem to 100 rem delivered acutely to the whole body would be in the right ballpark for something that one would consider comparable to a criticality, not the fraction of a rem dose that we also saw for some criticalities because were not too close.

DR. NETON: Yes.

DR. MAURO: And where we ended up -- and I think we did have quite a bit of discussion and disagreement related to can you truly compare -- let's just for the sake of argument now, assume that the 25 to 100 there is general consensus that that falls into the right ballpark for acute, whole body, penetrating radiation as being comparable to a criticality, then Hans performed an analysis, okay, let's do a blowout and see what kind of doses we get.

And the kinds of doses are different. We're talking doses that certainly are in that range. But they're dose

commitments, internal dose commitments which are delivered over years.

And, for example, I'm looking at the table right now -- there is a table in Hans's report where well if you just look at the bone dose -- and now it's not whole body, now we're talking organ dose, look at just one year, we're talking 12 points of rem.

Now you may have come up with a number a little different. And then if you're looking for 30 year -- this is thorium now -- dose commitment per blowout, we're talking 214 rems. So in effect, we do have a difficult question in front of us.

And that is maybe we're talking about doses that are comparable but in terms of absolute sense in terms of where we would agree but where there is, I would say, almost at risk of say a policy decision, is a dose commitment, a 30-year dose commitment equivalent to -- that would be, in this case, 214 rem to the bone.

Would that be considered to be comparable to equivalent to a criticality exposure? And therein lies the nub.

DR. NETON: Yes, I think John has summarized it pretty well. And that was the crux of our discussion at the last meeting which is are internal exposures -- internal committed exposures comparable to an acute exposure.

And I can only say that I remember thinking back when the rule was being written that the criticality analogy or the, you know, analogy that's in there was really more so that it would be sort of intuitively obvious that this exposure endangered health.

And almost to the point where you are talking about potentially having stochastic health effects, you know, something like, you know, blood, you know, human --

MEMBER GRIFFON: You mean non-stochastic.

DR. NETON: -- I mean not

stochastic -- non-stochastic health effects like blood disorders, you know, lymphocytes production and cataract formation, you know, things of that order.

And so then it would be somewhat general agreement among a health physicist looking at this that yes, this was a very large exposure. And it's easily determined to be as such.

When you get into internal exposures, where you have protracted exposure, they're not acute, you're not going to have any long-term health effect -- and, in fact, in this particular analysis, I think you are looking at multiples of the annual limit on intake. You know these are not like where is the magnitude kind of thing.

So I have a little difficulty comparing the two. And that's exactly where I think we left off.

Is 214 rem, 30-year committed dose to bone surfaces equivalent to an

instantaneous 200 rem whole body exposure? Probably not.

And, in fact, you also have to remember the fact that we have the GDREF incorporated into this analysis, which gives -- infers less risk per unit dose from chronic exposure which, by definition, all internal exposures are.

DR. MAURO: But I would like to also add we know that there were multiple blowouts in a given year -- in a given 250-day period. So we can't discount that either.

DR. NETON: Right. But again, you get -- instantaneous -- the law -- the rule talks about a one-shot incident versus 250-day. When you start talking about multiple blowouts, now you're talking about multiple exposures. I agree. I understand. I hear what you're saying.

You know, it's just there is no in between in the way the current rule is written. You can't say well five blowouts

would do it, you know that will get you there-kind of thing. It's just not possible.

CHAIR MELIUS: Well, we can always change the rule which is a possibility. But what about a different tact again, hypothetically, what if you made a determination that you can do some sort of bounding dose for a blowout, okay.

And you assume then that anybody working that time period less than 250 days -- because you've determined over 250 days you can't reconstruct. But less than 250 days would have, you know, been exposed to one blowout per month. And that would be part of, you know, your dose calculation for that person.

I mean that would, you know, maybe I don't know -- it's been so long since we've talked about Ames and specifically how common they were, but one per month or one per week is not, you know, is certainly within the range of what was talked about.

So for a person that was less that 250 days, you would do the dose reconstruction. Your assumptions for the dose reconstruction would be whatever, you know, was measured, et cetera, plus assuming one blowout per week exposure.

DR. NETON: That's a viable option.

MEMBER GRIFFON: Well, now you're talking about a way to bound it rather than --

DR. NETON: Right.

MEMBER ZIEMER: But you would have a bounding rule then.

CHAIR MELIUS: Partial dose reconstruction that just looks -- because you've agreed that if it is over 250, you know, I mean it's a way of trying to address an issue within the -- sort of the constraints of what we -- how we've approached how our regulations are written.

DR. NETON: I don't disagree. That certainly could be approach. I mean we have to --

MR. ELLIOTT: Can you bound that dose? Or do you have to come out? You have to be able to --

MEMBER ZIEMER: This is Ziemer. Could I add to that comment? In fact in all of these cases, in order to assess whether or not something is a viable option such as a blowout, we end up having to bound the dose for the blowout to see if it is eligible, in a sense. So on all of these you end up doing exactly that.

You have to sort of say what dose could have been received by this kind of activity? So don't we end up bounding them anyway?

MEMBER GRIFFON: But I'm just -- I mean we're going back and forth between the policy question and the Ames question.

MEMBER ZIEMER: Yes, but I'm following up on Jim's idea that if you could establish a sort of typical frequency and a bounding dose, then you could take that -- use

that in a dose reconstruction for the individual who had less than 250 days and, therefore, didn't qualify for an SEC status.

MEMBER GRIFFON: But have you already said -- for the people over 250 days, you've already said that you can't reconstruct or bound doses, right?

DR. NETON: Yes.

MEMBER GRIFFON: So now you're going to say for those less than 250, all of a sudden we have respondents that know how to bound. It's a little --

DR. NETON: Well, this is 250 days' exposure working with thorium. So you can't bound the chronic exposure.

MEMBER ZIEMER: Now this is only a partial --

MEMBER GRIFFON: It's a way to give them some credit, I guess, partial dose reconstruction.

DR. NETON: Well think about someone applying for an SEC and saying I want

to apply for blowout compensation, how would we handle that?

We would probably do something very similar to what Dr. Melius just mentioned. We'd say well, okay, you were involved in blowouts and we know that -- we know the amount of material that was involved, we know the duration, I mean --

CHAIR MELIUS: Yes, you know, we'll take the 95th percentile of the average number of blowouts that -- whatever, we have some frequency information or --

DR. NETON: Hans did just that.

CHAIR MELIUS: Yes.

DR. NETON: I mean he did a very, you know, nice analysis trying to take into account the size of the building and such. We feel that it is a little bit on the high side but nonetheless, you know, an approach similar to that, you know.

MEMBER GRIFFON: Demonstrates the principle.

DR. NETON: A somewhat similar approach would be viable.

DR. MAKHIJANI: It seems to me that the problem with that is that if you're going to say one blowout a month, and you're already with one blowout, I would say you got implausibly high doses.

DR. NETON: No, one blowout if we used the uranium thorium bioassay data. I'd probably go back and reconstruct what the exposure would have been if I took the 1952 uranium thorium bioassay data and assume the acute exposure nine months prior to that.

DR. MAKHIJANI: Oh, okay. Sort of guess the date of --

DR. NETON: Yes, I mean okay what if it happened nine months before, the exposures come out huge. The blowout exposures come out high. I would not say that they are implausibly high.

DR. MAKHIJANI: Yes, all right.

DR. NETON: You could envision, you

know, some of these are -- the instant case, you're talking about a 40 nanocurie intake of thorium here. This is not a massive amount of thorium to inhale. I mean it's .04, yes, 40 nanocuries of thorium intake.

Those are not unlike what we see in a number of chronic exposures. So, you know, these are not out there ridiculous. I mean the bone doses are high just because of the long-term retention of the thorium in the bone.

MEMBER ZIEMER: This is Ziemer. Jim, could I ask on that issue is the problem the fact that you are way out on the long tail of excretion and you just have a single point?

DR. NETON: For the thorium bioassay?

MEMBER ZIEMER: Yes.

DR. NETON: Yes.

MEMBER ZIEMER: You said the model gives you implausibly large results and --

DR. NETON: Well --

***MEMBER ZIEMER:** -- you know the model is still the model. And so what -- is there any -- I was trying to think whether there's any precautions even in the ICRP's discussion on use of the model in that way. Obviously, a single point on the tail of a model, you could be off by quite a bit.*

***DR. NETON:** Yes, actually --*

***MEMBER ZIEMER:** A priori, one says you can use that but then to go back and say "But I don't like the results, therefore I can't use it doesn't work." I agree it's implausibly large but we still -- the model is still the model.*

***DR. NETON:** Right. I think what happens here, Paul, is the misdose -- well, we didn't know at what point to go back to as far as the acute exposure.*

***MEMBER ZIEMER:** Oh, yes. I understand that. We're going back awfully far.*

***DR. NETON:** And, in fact, we used*

the 95th percentile of the bioassay data.

MEMBER ZIEMER: Oh, okay. That's what --

DR. NETON: It was 2.7 picocuries per day excretion.

MEMBER ZIEMER: Yes, yes.

DR. NETON: If you're excreting 2.7 picocuries of thorium -- I think we went back nine months -- 245 days we went back, you know, it's probably ten to minus six or ten to minus seven the excretion fraction or something at that point.

So you multiply that number times a huge number and you end up with these intakes that -- I'm looking here, for type S, it imputed or it calculated 8.7 microcurie intake of thorium. That's not plausible even under these blowout scenarios that SC&A is calculating.

MEMBER ZIEMER: Yes.

DR. NETON: So it's just that thorium is a bad tool to go back to

reconstruct -- not a useful tool to go back and reconstruct plausibly bounding exposures.

DR. MAKHIJANI: I think you got what -- 50, 70 grams of thorium.

DR. NETON: Yes, it's a massive amount of intake.

MEMBER ZIEMER: Yes.

DR. NETON: The 40 nanocurie intakes projected by the SC&A model -- frankly 40 nanocuries is not that high. I mean it's -- you know, that's a few multiples of what the ALI used to be anyway -- the annual limit on intake.

Any intake of an alpha-emitting actinide like this will give you a fairly large dose.

DR. MAKHIJANI: In fact if you think about it, most of the SEC sites we've added have been for inability to reconstruct internal doses due to either uranium or -- well, actually mostly thorium.

But there is another -- I mean if

we turned the question that Mark raised, step back from Ames and say 250 days is a policy question, obviously it's not in the regulations, the internal dose. So you have to exercise some judgment, you know, somebody exposed to an acute event that results in high doses, what's the right thing to do?

But maybe the way the question should be framed is if you there have been acute incidents, would this person be compensated if they were there just for that one day as a worker for any one of the SEC cancers under a typical kind of claimant circumstances.

And the answer is yes. Then you could say well, you know, that incident qualifies. Now it doesn't let you compare it a criticality clearly but there is no way really you are going to compare committed doses to criticalities. It's two different things.

DR. NETON: But would you have done

a dose reconstruction then almost by definition and say he's compensated by dose reconstruction, not by SEC.

MEMBER GRIFFON: Yes, if you come down --

DR. NETON: I mean if you do a dose calculation and you say it's over 50 percent, I've done a dose reconstruction that's bounding and he's being paid.

DR. MAKHIJANI: Well, it's a hypothetical calculation. It isn't a calculation for --

DR. NETON: Not an individual, it's not a case. Then you get into the scenario that we talked about last time where you have a virtual infinite variety -- latency period and agent exposure.

DR. MAKHIJANI: Okay, I'm not suggesting there is an easy way out. I'm just saying --

DR. NETON: In fact, this is the reason the 250 days is in the regulation.

It's just too hard to put your finger on.

DR. MAKHIJANI: I mean there is a fairness idea in the law, like, you know, you've got to be fair, and timely, and all that -- I don't remember the exact words -- but if you focus on the word fair, how do you compare somebody that worked there for three months who were exposed to incidents that we acknowledge to be fairly severe but of the inhalation variety to somebody that worked there for 250 days who we assume -- automatically assume was in danger.

We focus on the in danger piece rather than the numbers. Can you ask whether somebody was exposed to thorium blowout was endangered in that sense? Leaving the numbers and risks aside, a qualitative judgement about endangerment.

DR. NETON: I'll go back to the rule that says can you put a plausible upper bound on that thorium blowout.

DR. MAKHIJANI: No, no.

***DR. NETON:** If the answer is yes --*

***CHAIR MELIUS:** No, no, I think Arjun is asking a different question. It's how do you evaluate endangerment? I mean that's what we're --*

***DR. MAKHIJANI:** That's right.*

***CHAIR MELIUS:** Yes, we're wrestling with less than 250 days. If the endangerment part of the --*

***DR. MAURO:** But within the context of the criticality -- see, at least in this case, this issue that we're dealing with, we have some guidance in the statute. And that is criticality.*

The question of endangerment in general as being a criteria is something that we've never engaged.

***DR. NETON:** Well, I think that it's pretty specific. It says if you cannot put an upper bound on the dose then health was determined to be endangered. That's the way -- every time we present an SEC evaluation,*

that's what we say. That's the test.

Can you put an upper bound on it? No. By definition then, health is endangered.

DR. MAKHIJANI: No. The way I recall it says can you put an upper bound on it? No. That's the dose piece. And then for the endangerment, you say did they work for 250 days? And if the answer to that is yes, then you say endangered.

CHAIR MELIUS: Endangerment is always the, you know, it's 250 days and that there was exposure. We sort of -- we're not very specific about it.

DR. NETON: But health was endangered and 250 days is the default --

DR. MAKHIJANI: Right.

DR. NETON: -- unless there is some evidence of an extremely high dose incident such as a criticality. So it really is that if you can't put an upper bound on it then health becomes endangered. And 250 days is the default. That's just the way it plays

out.

DR. MAKHIJANI: I don't recall any -- well, maybe --

CHAIR MELIUS: It's a two-prong test that we've been presenting all these years. And it says that's the logic.

DR. MAURO: When we get to Dow, we are going to encounter the situation where perhaps there will be situations where we can't put a plausible upper bound and we're not quite sure if there's endangerment. But we'll get there later.

MEMBER GRIFFON: Yes, let's save that one.

(Laughter.)

DR. NETON: It's more complicated. It's not really the 250 days though. That's more

DR. MAURO: That is not really the 250 days -- but I'm sorry for that diversion.

MEMBER GRIFFON: But I mean back to this --

CHAIR MELIUS: ***But originally in the legislation and really in the regulations, it's a two-prong test. You know and the two don't connect. Right. I mean there's no -- and secondly, the criteria -- well, the criteria for both are not strict.***

But certainly in endangerment, you know, we simply adopted, you know, something that was from the legislation. The 250 days is the basic default. And then language that turns out not to be as -- maybe as clear as we all thought it would be on the endangerment issue.

And so it's -- how do we -- so with endangerment for these situations I think we're trying to deal with what has happened. What are the criteria for less than 250 days. And it may turn out that Ames is not the best example to wrestle with that.

It may be better to deal with Ames as something where the doses would be reconstructed in those situations. I mean,

yes, it sort of avoids the issue.

DR. NETON: It doesn't solve it.

CHAIR MELIUS: It doesn't solve it. But if it's fair to the people at Ames, that's -- you know, it's best way for Ames in this situation. I'm trying to think how many other situation we have where there have been so many reported incidents of this magnitude.

MEMBER ZIEMER: This is Ziemer. I'll just add as kind of an editorial comment here as well. I don't think it will ever be fruitful for us to argue that there's necessarily a fairness in the 250 days itself.

That's certainly kind of arbitrary. But that's the way it was established. Well, one could argue that someone who worked 249 days, why are they not endangered and the 250-day person is with the extra day.

It doesn't seem fair. But that's the default value. That's what we work with. So to try to argue fairness based on particular doses and particular incidents

isn't going to work if we try to compare it with the 250 days.

I think it becomes sort of technically kind of fruitless.

CHAIR MELIUS: But Paul -- this is Jim -- the 250 days was not -- was set in the regulation.

DR. NETON: It's in the law.

CHAIR MELIUS: Well, it's included for specific examples in the law. But NIOSH could have -- and I'll say we, so it's more than just I -- we collectively could have recommended something else --

MEMBER ZIEMER: Well, yes but --

CHAIR MELIUS: -- in that --

MEMBER ZIEMER: -- Jim, I think the same thing -- pick another number and you'll have the same problem.

CHAIR MELIUS: Yes, I don't disagree with that.

MEMBER ZIEMER: Pick 100 days.

CHAIR MELIUS: Yes, but I don't

think --

MEMBER ZIEMER: Then the issue is what happens at 99?

CHAIR MELIUS: Yes, yes.

MEMBER ZIEMER: I'm just saying you still have that sort of arbitrariness. It's very difficult to find the line where you say yes, if I don't know, this is where endangerment occurs. You are always going to have that arbitrariness to it I think.

CHAIR MELIUS: Yes, but I think we have to balance that arbitrariness with --

MEMBER ZIEMER: Yes.

CHAIR MELIUS: -- fairness as Arjun was --

MEMBER ZIEMER: Yes, I --

CHAIR MELIUS: -- articulating.

MEMBER ZIEMER: -- I would agree with that part of it. I think it's very difficult to establish fairness based on the 250-day value per se.

CHAIR MELIUS: Yes.

MEMBER ZIEMER: ***It actually works better -- in my mind, it works better if you can bound the dose because then we have some idea really of how likely it is that there really is a health endangerment.***

Without dose numbers, you know, the 250 days is sort aside from any dose number. And I think that's why we feel uneasy with it.

DR. MAKHIJANI: ***But I am a little puzzled about this bounding dose.***

CHAIR MELIUS: ***Speak a little louder, Arjun.***

DR. MAKHIJANI: ***I'm puzzled about this term bounding the dose because if we say we're doing a partial dose reconstruction, then you're not bounding the dose. I mean those two things are -- you are bounding the number for an incident but you're not bounding the dose to the person.***

MEMBER ZIEMER: ***No, but we do that on SECs all the time where a person doesn't qualify, then we try to establish a dose for***

-- or a partial dose reconstruction. I think that's what we will be doing here.

DR. MAKHIJANI: Yes, but only --

MEMBER ZIEMER: This will be a partial.

DR. MAKHIJANI: -- we do that in a completely different context. If you do that for cancers that are not part of the SEC list --

MEMBER ZIEMER: Or for people who have been there less than 250 days.

MEMBER GRIFFON: But you also do it for the items that can be reconstructed. You used to say --

MEMBER ZIEMER: Right.

MEMBER GRIFFON: -- it can reconstruct incidents.

DR. NETON: Or incidents.

DR. MAURO: In a funny sort of way, this is not unlike just using medical x-rays. If it's the only thing you can do, that's what we do. And what we're really saying is

well, the only thing that we can do here is -- it sounds kind of --

DR. NETON: If there were incidents, we can bound them.

DR. MAURO: But this one, I mean to say that just like x-rays we can place an upper bound -- in effect where I was headed was -- this approach, should it go forward as being contemplated, would be equivalent to this -- the way in which x-rays are dealt with.

This is a situation that the judgment is yes, we can place an upper bound. I think that there is general agreement that the kind of scenario that Hans constructed seems to be reasonable, not bounding, for a single blowout.

And the dilemma that we're dealing with is how many blowouts do we assume?

MR. KATZ: Excuse me. Someone on the telephone is having a conversation about muting the phone. If you just go ahead and do

that please, it's interfering with the discussion. Thanks.

DR. NETON: Yes, I agree with John. That then becomes sort of on a case-by-case basis analysis. Like the two cases I just reported that had less than 250 days that didn't qualify for the class, one, in my mind, in particular, wouldn't qualify for any blowouts probably. Yet the other one, the person claimed they never worked with thorium but they walked through the area.

So you take each case as it happens, as it comes, with the idea that there probably wouldn't be that many.

MEMBER ZIEMER: One hundred fifty grand plus medical.

DR. MAKHIJANI: Well, the less than 250-day question doesn't apply to many workers. I mean generally people tended to stay in nuclear field if they had some kind of employment.

But I really think to say this is a

partial dose reconstruction is mixing up -- maybe I'm not getting it but it's mixing up two different issues because we're trying to look at an endangerment question for those who worked less than 250 days to see -- you know, at least this is how I'm thinking of the question: were the conditions of employment for those people who worked less than 250 days similar in terms of risk to those who worked for more than 250 days?

CHAIR MELIUS: But I think we're saying, Arjun, and, you know, that is the issue that I guess the workgroup was focused on. I think the resolution at Ames is not to deal with that. Maybe not to deal with that issue directly.

But a better way or the way of dealing with -- we can deal with the Ames situation by doing it as a partial dose reconstruction. And not having to address the endangerment issue.

DR. MAKHIJANI: But why. I mean if

-- that is what I am conceptually not getting. If you are saying the policy issue to be resolved is is there endangerment if you work there less than 250 days, how does that -- I just don't see the equivalent.

CHAIR MELIUS: Because 250 days only becomes an issue if you are -- if you can't reconstruct the doses.

DR. MAKHIJANI: But you can't. You can't reconstruct the doses.

CHAIR MELIUS: Well, you can do a partial --

DR. MAKHIJANI: You can always do a partial dose reconstruction for everybody.

CHAIR MELIUS: Yes. But you still need 250 days. If you have worked more than 250 days, you are in the SEC at Ames. I mean it's a pretty broad class definition. So it's under 250 days that we are concerned about.

DR. NETON: That brings up an interesting point, though, then if you start doing partial dose reconstructions for non-

presumptive cancers, then it has to be added back in there, and I know we're not doing that.

DR. MAKHIJANI: Then you open up the door for these --

MEMBER GRIFFON: Well that was my point is that you can't be doing something for the less than 250 days that you're not doing for the others.

DR. NETON: And a thought just occurred to me, you have got to think about the non-presumptives.

MEMBER GRIFFON: Yes. So I mean I think what we might have come out of this workgroup is that we're going to fall short on development of policy basically for -- you know, but this might come up in other SECs as we go forward, but the Ames example may not be, you know --

DR. NETON: And there were two test cases, right? There was Ames, and the Nevada Test Site, and I'm not sure where we stand on

that.

MEMBER GRIFFON: I don't know where that is.

CHAIR MELIUS: In this, well, we can talk about that in a second, and then I think there is a third that it was supposed to be addressed in, and I'm conflicted on that, but it's Apollo, I believe, the NUMEC site.

DR. NETON: That might be right. I'm not sure.

CHAIR MELIUS: The NUMEC site, it was in the letter. It was sort of reserved as an issue, I thought.

MEMBER GRIFFON: Yes, I think you're right, yes.

CHAIR MELIUS: No one has reported, nothing is done. And, again --

MR. RUTHERFORD: Dr. Melius, this is LaVon Rutherford, that is correct.

CHAIR MELIUS: I only remember because I had to be careful with it.

DR. NETON: I think what happened

is after this was taken up with the working group, there were SECs that had potentially a similar issue. And they were sort of just annotated that way.

DR. MAKHIJANI: The most reasonable way to resolve the 250, And you know, I mean, we've had a tangled discussion about this for two years now, what we did, you know, just decide on what an appropriate revision of the regulation might be, and just --

CHAIR MELIUS: But to go back, what we decided to do on the 250 days, because we tried a general discussion, and we weren't able to resolve it, and we spent probably a day doing that, or maybe more, but we said, let's look at some examples, and see if we go through the examples - one was Ames, the second was Nevada Test Site - would that help us provide a framework for how to approach it.

And so we've been focusing on Ames. We've had some problems dealing with Nevada. And we can talk about that maybe in a second,

but Ames is, I think would be either -- to me it's do the approach where we would do partial dose reconstructions on the blowouts.

I guess the second question -- and Liz, this came up before you were - while you were in transit - was sort of the issue that, does the current regulation allow multiple -- how does it deal with multiple incidents?

It talks about an incident, such as a criticality or something - I think that's - I don't remember the exact wording, but how do you deal with a situation of multiple incidents? And you don't have to answer now. I'm not sure that's --

MS. HOMOKI-TITUS: I can give you my off-the-cuff answer, but we would have to give you an official one later. Are you talking about multiple incidents that you would be using in a dose reconstruction, or trying to establish an SEC class?

CHAIR MELIUS: Trying to establish endangerment in an SEC class I think would be

the --

MS. HOMOKI-TITUS: Well, by the reg, it's either 250 days or presence. So it's not spelled out to say presence at three different events, because that would be more than one second presence. So I don't think the reg deals with that.

CHAIR MELIUS: Okay.

MS. HOMOKI-TITUS: I think that would require a reg change if you wanted to say, we need three incidents to make this an endangerment.

MR. ELLIOTT: I think an important component of the incident that's mentioned in the language, in the rule, is that it's an unplanned, unmonitored event.

And if we have a series of events, we have to start asking ourselves, okay, they were not unplanned. They knew that this kind of a blowout would happen on a consistent basis.

Were there any administrative steps

taken to reduce the number of blowouts? Or, you know, we'd have to look at it that way, I think.

DR. MAURO: If I recall the history of this whole problem, they got smarter as they went along. And they reduced the number of blowouts, but in the initial stages --

MR. ELLIOTT: And that doesn't answer endangerment, but that just answers, you know, what kind of a mindset, what was the culture.

MEMBER BEACH: I don't know, I mean this is not really my place, but you still -- it seems like you still have on the table this question that maybe Ames isn't giving you the answer to, but it seems like what would useful to answer is, what is the internal equivalence to the external acute exposure?

I mean, if it's not the blowout at Ames, but what would -- at what point do you say, this is the same kind of thing.

CHAIR MELIUS: Yes, and do you want

to quantify it?

DR. MAURO: We go back to the philosophy, and I think there was general consensus is when you're talking about the equivalent -- I guess a health impact that would be equivalent to what one would experience from an acute dose of 25 to 100 rem uniform whole-body exposure, that's the closest I can come to recollecting where we came out when we started to look at the criticality question.

You know, some folks mentioned as low as five rem, because you do see a little bit of blood change at five rem, but I think that was sort of rejected, and we drove closer to the 25 rem as being a little bit more reasonable.

And I think it's within that range that there was consensus around the table.

MR. KATZ: And Jim said that, you know, the case -- this case is different because, on the surface of the bone and the

way you do the calculation, it's really a very marginal case in a sense, he's saying. But what would not be a marginal case? If you could get to that point --

DR. MAURO: You could back it out. I mean, in effect, you can make it a risk equivalent. I mean, you could very easily convert a 214 rem 30-year dose commitment to the bone to what the risk equivalent would be to an instantaneous uniform whole-body dose.

MEMBER ZIEMER: I'm not sure you could do that at all very easily, John.

DR. NETON: Well you've got the -- the bone surface weighting factor is -- it's actually your .03 or .01, depending on which system you use. But even then, it's delivered over a long period of time.

MR. BEHLING: Can I make a comment here? This is Hans Behling.

One of the other factors that could certainly be introduced into this conversion, or trying to establish parity, is to use what

BEIR -- all the BEIR reports would recommend, and that is to make use of the factor of two that separates the cancer risk coefficient from an acute exposure versus a protracted exposure. So a factor of two would also be appropriate to reduce the protracted exposure of the cancer risk to an acute exposure.

DR. NETON: Yes, I agree with that, Hans. But it seems to me that now we're going down the path to establishing some type of risk, which we've already decided that 250 days is not necessarily dosimetric or risk based at all. It's a somewhat arbitrary number that was selected --

DR. MAURO: But it does go toward the -- if we decide there's a step that we've taken that - note when I say we - that would be taken, the step being criticality, what does that mean? Risk equivalent, it means having a potential acute symptoms, acute radiation syndrome symptoms, that's the step that we'd be taking that would not be in the

rule.

Now whether or not you want to take that step is another question. It would not be an unreasonable step, but I just -- which translates to about 25 rem is the floor of, let's say when you start to see blood changes of some significance, certainly 100 rem.

And now, in effect, you would have a very tractable process to answer this question in a systematic consistent way across the complex as it comes up if you want to engage that problem at this point in time.

MR. ELLIOTT: But if you say that, then you've effectively bounded the dose, have you not? And if you can bound the dose, you don't need to add the class.

DR. MAURO: Well, the good example would be here, in other words, if we were to apply that rule, we'd ask ourselves the question, is it plausible that a person could have gotten -- in other words, how many blowouts would he have to experience to cross

that threshold, and is that plausible?

DR. NETON: Now we're getting into multiple sides of the issue, which the rule simply doesn't necessarily handle.

DR. MAURO: But it's silent -- but right now it's silent on that, as we just heard.

MS. HOMOKI-TITUS: Well no, it says presence, or it says an incident for presence for 250 days. So it's not really silent on that. I mean, you have presence, so you're going to have a really hard time saying, these three events were all happening at the same time, I mean, unless they were.

DR. MAURO: Well, I guess I don't understand. Let's say you were present for 250 days, and that's it. And during those 250 days, there are N number of events that we could place an upper bound on.

Would you consider those N events to be part of the equation? Not just one, but three, five, ten -- just some number. In

other words, I guess I don't quite understand.

MS. HOMOKI-TITUS: I guess I'm a little unclear on your question.

DR. MAURO: I think it uses singular.

CHAIR MELIUS: If it's always singular, and I don't have it in front of me, or whatever, I think then what Liz is saying probably makes sense, I don't know.

MS. HOMOKI-TITUS: You're present for one second, so there's something happening during that time, or you're present for 250 days. If you're talking about the SEC, then it doesn't matter how many events happened during that 250 days.

CHAIR MELIUS: It's presence at an event, I think is what --

MS. HOMOKI-TITUS: Presence, yes.

CHAIR MELIUS: An event I think it's how it -- but --

MEMBER ZIEMER: This is Ziemer. That assumes that all the health endangerment

during the 250 days is due to those events, whether it's three, or ten, or whatever, but really under the rule, it's everything that occurs in the 250 days.

And one could argue that it's everything -- it's those events plus whatever else occurs, which you can't bound. And since you can't bound it, you don't know that those are the most significant, in theory.

CHAIR MELIUS: For Ames, just Ames, away from the bigger question, do you want to look more into -- what's the next step from your perspective? Do you want to look back at -- I mean, I think this is the issue of sort of how many blowouts, and what's a reasonable way of approaching this and so forth, and thinking through how you do it.

MR. ELLIOTT: It helps all the non-presumptives.

DR. MAURO: Exactly. I mean it's sort of a --

MR. ELLIOTT: Because right now

we're not doing that.

DR. MAURO: Right.

MR. ELLIOTT: And I guess I'd wonder what's happened since. You know, did we not look at this trying to bound the blowout dose, or not? We just threw up our hands and said we can't reconstruct dose for that class.

DR. MAURO: Yes. Exactly, and then the blowout issue was raised.

CHAIR MELIUS: Why don't we do that, and then we can proceed. And that will get this at least resolved hopefully on Ames. And again, how many people it applies to, but the problem with --

MR. ELLIOTT: I think it applies to one.

CHAIR MELIUS: Exactly. And then you also have people that have been sort of dissuaded from applying even because they worked there for less than 250 days. I think I've seen some e-mail graphics by at least one

person who hasn't applied. Or they get shunted into Subtitle E or something like that, I don't know.

But anyway, NTS.

DR. MAKHIJANI: Well, the last report on NTS we gave you, Jim, was about a year ago.

CHAIR MELIUS: Right.

DR. MAKHIJANI: It was a working paper.

CHAIR MELIUS: October 2007.

DR. MAKHIJANI: Well, knowing the cases that Jim filed, and people who might have had relatively higher exposures --

MEMBER ROESSLER: This is Gen. Arjun, could you get closer to the microphone?

CHAIR MELIUS: Okay, speak up, Arjun.

DR. MAKHIJANI: Yes, this is Arjun Makhijani. The last report we gave this working group was about a year ago in which -- no, it's called Working Paper on Nevada Test

Site, Incidents Related to Consideration of Employees with Less Than 250 Days of Employment October 2007.

And in that, we had a number of workers - 22, I think - where we surveyed the external dose, and looked at whether there were acute exposures, and whether the people were involved in incidents. It cataloged the kind of incidents they had been involved in.

We did not make any judgments about the 250 day issue, but we just laid forth the people who were actually involved in the incidents, and there is quite a bit of detail in all the references so that you could make your own judgment about whether -- and there is a table one that I have in my computer. I can send it around to people. I have it in my computer. I can send it around to people.

CHAIR MELIUS: Well, but Arjun, I'm actually mainly interested in sort of figuring out next steps, not trying to discuss --

DR. MAKHIJANI: Yes. Okay.

CHAIR MELIUS: -- it here today. It's not fair to people who we haven't alerted them.

DR. MAKHIJANI: Okay.

CHAIR MELIUS: But we have discussed this paper already once.

DR. MAKHIJANI: Yes.

CHAIR MELIUS: And then we were going to go to see whether we could use some of the DTRA methods, and that was explored.

DR. MAKHIJANI: Yes, and it came to a -- yes, we -- you know, there has been so much controversy and difficulty and difference that we kind of --

CHAIR MELIUS: Yes.

DR. MAKHIJANI: -- I think in conversation that you and I had --

CHAIR MELIUS: Right. Well yes, it didn't make sense to pursue.

DR. MAKHIJANI: We thought we were not going to pursue that too much.

CHAIR MELIUS: Yes.

***MEMBER ZIEMER:** What was concluded - this is Ziemer - what was concluded on the DTRA method? I recall that you were going to look at that, but I don't recall the outcome.*

***DR. MAKHIJANI:** It's been a little while since I looked at the specifics of it. We did look at it, but the whole methodological questions and the differences between what NIOSH had done and DTRA had done in terms of being able to calculate internal doses from external doses seemed kind of pretty iffy, because NIOSH had actually abandoned that approach in deciding to grant the SEC.*

And then it would seem -- it seemed like one would then have to get into all the details of what every -- all these agencies have done. It didn't seem very productive to do that.

***CHAIR MELIUS:** This is like -- I think we need to get back to that October report and think about it so it either can --*

we resolve the discussion. We thought it was a way of trying to help, you know, facilitate the discussion of, really of the endangerment issue, getting a better handle on what the --

DR. NETON: Wasn't -- I'm sorry.

CHAIR MELIUS: Go ahead, Jim.

DR. NETON: It's coming back a little bit now.

CHAIR MELIUS: Yes.

DR. MAKHIJANI: It's been a while.

DR. NETON: Were we not going to take a look at what the magnitude of the doses that DTRA had reconstructed --

DR. MAKHIJANI: Right.

DR. NETON: -- as sort of an indicator of how high these really were -- given the fact that we had some differences with DTRA, and you're saying that we really couldn't use those values, but at least to get a rough order of magnitude, are these internal doses, you know, very large, small, you know, what are they? I think that was kind of --

DR. MAKHIJANI: I don't think the internal -- from memory, I don't think the internal dose as calculated by DTRA would vary.

But then the question is, what significance are you going to attach to that without looking at the methodological questions? And that's sort of the --

DR. MAURO: Exactly.

DR. MAKHIJANI: -- can you ascribe any significance to it?

CHAIR MELIUS: What do we do with the information?

DR. MAKHIJANI: What do you do with the number?

DR. NETON: Yes, given that we've already said that it's not useful for our purpose.

DR. MAKHIJANI: Right. So then to introduce -- you know, we thought about it some, and we thought to introduce numbers into the debate without being able to say what they

mean, and how they compare seemed --

CHAIR MELIUS: And how they got there, right.

DR. MAKHIJANI: -- kind of not -- without further direction from the working group, it seemed not worthwhile.

DR. MAURO: Yes, we did make a couple of inquires and thought it through.

DR. MAKHIJANI: Yes. And the dose is -- Jim is right. The dose is not very high.

CHAIR MELIUS: Why don't I suggest that everybody look at the October `07 report again? Maybe we can do either a quick workgroup meeting at the -- at our Augusta meeting, a breakfast meeting or something, or we can do a phone meeting, and sort of move on from this. It's not fair to expect people to discuss something we haven't looked at for a year.

DR. MAKHIJANI: Jim, should I recirculate the report?

***CHAIR MELIUS:** Yes, if that helps.*

***DR. MAKHIJANI:** I do not believe it has -- let me see here.*

***MEMBER ZIEMER:** Can I ask -- this is Ziemer -- I just want to ask, because I'm looking at that report right now, and just to refresh our memories, I think, Arjun, you had provided, I think, actual external dose monitoring values for the 22 persons, plus you had appended an accident report which detailed doses for a number of individuals.*

So we were looking at least at the external values to get a -- some idea of the magnitude of exposures, and I think we were going to see what DTRA did.

I think we knew that DTRA mainly focused also on external. My question is, were we also going to look at the internal -- were we looking at updates, as well? Arjun, do you recall if you were going to look at that, or --

***DR. MAKHIJANI:** Excuse me, Dr.*

Ziemer, the idea of compiling that table was to look at people who were involved in incidents, and I actually laid before you whatever detail on the issue is available.

MEMBER ZIEMER: Yes, yes, I understand that, yes. But that was mainly --

CHAIR MELIUS: And we did that.

MEMBER ZIEMER: -- external dosimetry that you were able to uncover there.

DR. MAKHIJANI: Yes, I mean incidents with potential internal dose.

MEMBER ZIEMER: Right, right.

DR. MAURO: It was effectively a compendium, 22 cases.

MEMBER ZIEMER: Right.

DR. MAURO: And out of the 22 cases, we did get some pretty good information on what the magnitude of the external exposures were.

MEMBER ZIEMER: Exactly.

DR. MAURO: But we -- and I'll give you the highest one we got was 18.5 rem.

MEMBER ZIEMER: Right.

DR. MAURO: But when we looked at --

MEMBER ZIEMER: That was an annual -- I mean that was the annual figure. It may have been one event, but it was annual.

CHAIR MELIUS: Good question. I'm not sure -- I have the number in front of me, but I'm not sure if it's annual or --

DR. MAURO: Well, well, the tables are all by year.

DR. MAKHIJANI: Annual, it's annual.

CHAIR MELIUS: But I read this last night in anticipation we might do this, and there is quite a bit of information regarding the nature of internal exposures, but it's semi-quantitative.

That is, where we could get some estimates of what the internal exposures were, like a thyroid dose of 37 rem, in one particular case. But I would say, in general,

what we found is that it's hard to extract a good compendium of data on what the internal exposures might have been, especially associated with some of these -- the internal exposures that went hand in hand with these external exposures.

But certainly everyone should read it. It's just one case study after the other. It gives you a good handle on the kinds of information that are out there.

DR. MAKHIJANI: So I'll recirculate that, and I'll have Nancy send it for Privacy Act review.

CHAIR MELIUS: Okay, which may be hard. It's going to be hard. It's going to be very difficult.

MEMBER ZIEMER: That's true, you circulated a Privacy Act review to the working group so that we can all --

DR. MAKHIJANI: Yes. Right. I'll do that, yes, sure. I'll circulate what I have.

CHAIR MELIUS: Okay. Good. Okay.

I think that concludes what we can do on the 250-day issue today. Why don't we take about a ten-minute break, and come back at about a quarter of 11:00 and do the -- talk about Dow.

MR. KATZ: Okay. I'm just putting the phone on mute.

CHAIR MELIUS: Okay.

(Whereupon, the above-entitled matter went off the record at 10:37 a.m. and resumed at 10:50 a.m.)

MR. KATZ: Okay, the SEC workgroup is back and ready to start again. We're going to be discussing Dow, and we have two individuals in the room joining us since we began, Stu and --

MR. HINNEFELD: Yes, Stu Hinnefeld from NIOSH.

MR. KATZ: And conflict or not with Dow?

MR. HINNEFELD: No, I have no

conflict with Dow.

MR. MAHATHY: Mike Mahathy over at ORAU. No conflict.

MR. KATZ: No conflict.

MS. HOMOKI-TITUS: And Liz Homoki-Titus, HHS.

MR. KATZ: So three individuals. Liz came in a few minutes late, and if anyone -- if there's anyone new to the phone who wants to self identify, please do.

Okay. Now we can start.

CHAIR MELIUS: Yes, just logistics. Our plan is to go until noontime, and then we'll make a decision, see where we are in terms of discussion and so forth, and then figure out how we handle lunch and et cetera.

This is the first time that this workgroup has discussed the Dow SEC, and our main focus today is going to be on the SC&A report from August 2008, which is called a Focused Review of Addendum 2 to the Dow Chemical Madison Plant SEC Petition Evaluation

Report.

I thought it might be helpful -- I don't know if LaVon is still on the phone, or if Stu or somebody could give us --

MR. RUTHERFORD: I am, Dr. Melius.

CHAIR MELIUS: Yes, could you give us sort of a brief history on the Dow SEC so that we can have some context for this report --

MR. RUTHERFORD: Sure.

CHAIR MELIUS: -- session? Thanks.

MR. RUTHERFORD: Yes, this is LaVon Rutherford.

September -- about September of 2006, we determined dose reconstruction was not going to be feasible for the operational period for Dow. In November of that year, 2006, we sent a letter to the petitioner informing them that dose reconstruction would not be -- to a potential petitioner that dose reconstruction would not be feasible.

And we received that petition on

November 28th of 2006. In December, we sent a letter to the petitioner explaining that we would not be presenting at the December board meeting in 2006 because of a number of issues.

In January 2007, we sent a letter to Dow requesting documentation on Dow Midland. In April of that year, we issued our first evaluation report. The evaluation determined dose reconstruction was not feasible for the 1957 through 1960 period. We did -- although it was --

MR. ELLIOTT: LaVon?

MR. RUTHERFORD: Yes?

MR. ELLIOTT: LaVon?

MR. RUTHERFORD: Yes.

MR. ELLIOTT: This is Larry.

MR. RUTHERFORD: Yes?

MR. ELLIOTT: I think you need to be specific on what we could and could not reconstruct.

MR. RUTHERFORD: I'm just getting ready to do that.

MR. ELLIOTT: Okay. Sorry to interrupt.

MR. RUTHERFORD: Again, April 2007 evaluation report we issued, and we determined dose reconstruction was not feasible for the 1957 through 1960 period. However, we did determine that, at that time, that dose reconstruction for the residual period was feasible.

At that time, the only covered exposures that were required to be reconstructed for the residual period was uranium. And in that report, we determined dose reconstruction was feasible for uranium during the residual period.

Late April of 2007, just before we presented our evaluation report to the board, we received additional documentation from Dow. We presented our evaluation report at the May 2007 advisory board meeting. The advisory board concurred with NIOSH to add the class from 1957 to 1960.

The petitioner at that time contended that thorium should be a covered exposure, and that the residual period dose reconstruction should include thorium exposure.

NIOSH indicated that, at that time, thorium is not a covered activity, that the thorium work was not a covered activity, and therefore, the thorium exposures would not be accounted for during the residual period. And therefore, NIOSH had not evaluated that as part of the residual period.

The advisory board, at that time, decided to send a letter to the Secretary of HHS requesting that the Secretary consider adding thorium activities as a covered activity. In addition, the advisory board asked NIOSH to evaluate whether dose reconstruction for thorium exposures are feasible during the residual period.

At that time, NIOSH had concluded, though, that they would not evaluate the

thorium exposures during the residual period because we could not put resources to calculating thorium exposure during a residual period that was not a covered activity. That would have been -- this is just a side note -- that would have been, wouldn't have been a good idea to use resources for an activity that was not a covered activity.

May 29th, 2007, the advisory board sent a letter to the Secretary of HHS asking that thorium activities be considered a covered activity.

On August of 2007, Addendum One is issued -- Addendum One to the evaluation report is issued to address additional documentation received from Dow in that late April period. The addendum concluded that the documentation provided by Dow did not change the original feasibility determination.

On August 30th of 2007, Dr. Gerberding with CDC, at the direction of Secretary Leavitt, sends a letter to Dr.

Ziemer and the board indicating that CDC -- or that HHS is not responsible for determining covered activities. That is the responsibility of the Department of Labor and the Department of Energy, and therefore, cannot add thorium activity as a covered activity. Dr. Gerberding did offer technical assistance from NIOSH.

On September 10th of 2007, the Department of Labor sends a letter to the petitioner concluding that the information provided does not support changing the coverage for the Dow Midland facility.

On January 8th of 2008, the Department of Energy sends a letter to the Department of Labor concluding that magnesium thorium alloy plates and sheets provided by Dow to the AEC could have been used in atomic weapons, and therefore, should be considered a covered activity.

The Department of Energy presented at the January 2008 advisory board meeting

their findings concerning the thorium activities. NIOSH indicated at that time that they would evaluate the feasibility of completing dose reconstructions for the residual period for thorium exposures. NIOSH had already concluded dose reconstruction for uranium during the residual period was feasible.

On February 28, 2008, NIOSH requests a clarification from the Department of Labor as to whether DOE's findings supported changing the covered period because of the addition of the thorium activities.

On March 7th, 2008, NIOSH sends a letter to Dow requesting additional documentation that could be used to reconstruct thorium exposures during the residual period.

On March 11th of 2008, the Department of Labor sends a letter to NIOSH concluding that the covered period should not be extended because of the addition of thorium

activities as a covered activity.

On June 3rd of 2008, NIOSH issued their Addendum 2 to the evaluation report that concludes that dose reconstruction of thorium exposures during the residual period are feasible.

NIOSH presents the Addendum 2 at the June 2008 advisory board meeting, and the advisory board concludes they will have SC&A do a focused review on the addendum, and they will give OTIB-0070 to the procedures group for review.

On September 3rd, 2008, SC&A issued their Focused Review of Dow Addendum 2, and on September 8th of 2008, NIOSH issues Appendix C to the Dow, which is the Dow Chemical part of Battelle 6000 for reconstructing Dow claims, and starts reconstructing -- or starts completing dose reconstructions.

And that takes us pretty much right up to the workgroup meeting.

CHAIR MELIUS: Okay. Now SC&A has

issued two reports on, if I'm correct, on the Dow site. One was in August 2007, which is a focused review of operations and thorium exposures at the facility. And then secondly, there is this Focused Review of Addendum 2.

The Focused Review of Addendum 2 was much more specific to the SEC petition, and is the one -- is also the most recent report, August 2008, and it's the one that we will focus on.

And I talked to Jim Neton last week about this, and although NIOSH has not done a formal review of this, or written a report yet, at least one that has been released, he is prepared to discuss some of NIOSH's reaction -- technical reactions to the SC&A review.

So I think that's what I'd like to start our discussions on, and then see where that takes us, and we can decide what else we need to do.

So, Jim Neton.

DR. NETON: Well, I don't know --

CHAIR MELIUS: Or whoever --

DR. NETON: I don't know if you're prepared to go through, and with Mike Mahathy's assistance, respond to these individually, or how do you want to proceed?

MR. RUTHERFORD: Jim, I apologize. I've been out for --

DR. NETON: Okay.

MR. RUTHERFORD: -- the past week.

DR. NETON: That's fine. Well, hopefully -- Mike Mahathy is here, and I think he's the lead on preparing these responses, so there were how many findings that were issued -- seven findings that were presented in the SC&A report that was issued in September 2008, right?

And we can go through those one by one, and just have a general discussion of where we go --

CHAIR MELIUS: Would it be helpful if John or someone did a quick --

DR. NETON: Yes.

CHAIR MELIUS: -- summary of sort of the focus where their report came out, I think would be helpful.

DR. MAURO: Yes, I'd be happy to. I'll give you an overview.

Bill Thurber, who is the principle author of this, is on the line, so we can get into a little more granularity.

To go back to the first report, though, is probably good just to make it clear, in our first report, we reviewed NIOSH's judgment that they could perform dose reconstruction for uranium during the `57 to `60 period, and the residual activity associated with it, and we concurred with that.

And the -- and they also concluded that they could not reconstruct the doses associated with thorium during that time period. And we have certain observations -- we were a little bit more concerned with

thoron than we were with thorium, but nevertheless, we concurred with that decision also.

Now moving off from there, then came this issue related to the thorium again for the residual period. Now this is interesting because we carefully reviewed the protocol that NIOSH presented in what we'll call their Addendum 2 to the thorium report, where they claimed that they can perform dose reconstruction.

And it's important to recognize that the approach that was adopted also makes reference to a procedure, OTIB-0070. So that was part and parcel to the review, and we reviewed both, and the workgroup and the board have both reports.

Now the -- to get to the -- I'll give you the bottom line, and then we can sort of let it expand from there, is that the way -- the approach that NIOSH has taken can be thought of like this. That is, during the

operations period, while the weapons-related thorium was being produced, which was in the late 1950s, the idea being that, okay, we do have data on the airborne levels of thorium at the facility at that time.

And we can make the plausible but claimant-favorable assumption that the dust loadings of thorium at that time represented an upper bound of the airborne activity resulting from the resuspension of residual radioactivity that might have accumulated at the site at that time.

And that basically begins the starting point, January 1st, 1960, of what an upper bound might have been for the airborne dust loading for thorium. And then from there on, since there was no longer any additional -- starting at that point, it's assumed that, okay, so that's -- we can sort of say we could place an upper bound on the inhalation exposures from thorium on January 1st, 1960 based on those measured values.

But then as time goes on, that activity is going to decline, and to a point where it exponentially gets lower and lower and lower to some level, and there are actually some measurements made much later on, I believe actually as late as 2006, of residual radioactivity of thorium at the site.

So in principle, the idea being that, well, we know the starting point of what might be an upper bound of the airborne dust loading from resuspension, and we know that it's gone down sort of exponentially over time, and we could probably peg the lower end of what that might have been, place a plausible upper bound of what the end would be, and from there, you have a curve showing the airborne concentration of thorium 232 in air as a function of time due to residual activity associated with weapons-related activity for thorium at the facility.

Now our principle concern is that, based on our review of the literature, the

vast majority of the thorium that was processed at Dow was not related to weapons production based on a review of purchase orders, okay? Basically we looked at purchase orders from Mallinckrodt and a number of other places.

And the bottom line is an extremely small fraction of that airborne dust that was measured in the late 1950s was associated with weapons-related activity. Perhaps on the order of less than one percent, perhaps .1 percent.

And therefore, the entire model, starting from 1960 onward, represents an implausible scenario. We completely agree that it's an upper bound. Bu we believe that the rule also states that the scenario that results in those exposures have to be plausible.

And we don't think it's plausible that any worker was ever exposed to residual activity of weapons-related thorium activity

that was on the order of these numbers that you folks make reference to.

And that was the front end of our problem. The back end of our problem, when you get to the later years, is that the measured activity that was, you know, reflects a number of things that confound the problem further.

One is, whatever was measured there residual on surfaces, was due to all the thorium processing that took place, so therefore, it's some kind of mixture of commercial and weapons related, probably a very, very small fraction of which was weapons related.

But making it more complicated is that whatever was measured was measured after there was quite a bit of decontamination activity that took place prior to then. So therefore, we have offsetting effects.

In one respect, on the back end now, the later years, you are grossly over

estimating the contribution of weapons-related thorium, but on the other hand, you might be underestimating it because you're not looking at residual activity that was there over the years. It's residual activity left after cleanup.

So I guess that represents conceptually our concern that the construct, though bounding, is really not scientifically plausible.

And Bill, is there anything - I try to really capture it as briefly as possible - is there anything you would like to add to that to enrich the story a little bit? Bill Thurber, are you on line? Bill?

MR. THURBER: Hello, can you hear me?

DR. MAURO: Yes, hi, Bill. Yes.

MR. THURBER: Yes, I heard what you said, John.

DR. MAURO: Did I capture the story?

MR. THURBER: Yes. I think you captured it well. I think that the points are -- the overarching points are, one, that what NIOSH did is clearly bounding; two, our fundamental concern is that, while it's bounding that we have some reservations of whether it meets a plausibility test because we think that a number of the assumptions that were used overstate the problem by perhaps orders of magnitude.

And the most specific thing is the fact that the new evidence that underlies the whole Addendum 2 thing was that a determination that some of the magnesium thorium alloy could have been used for atomic weapons, not was, but could have.

But anyway, setting that aside, if you look at the specific data as to how much magnesium thorium alloy was shipped to Mallinckrodt in 1957 and 1958, it's a few thousand pounds, and that is a tiny fraction, as you said, of the total magnesium thorium

alloy production.

And so using -- unless you compensate for that, you come up with very large numbers of residual radioactivity.

We had a number of other points of technical details relating to things as to exactly where NIOSH got the data that they used in specific calculations, or why they screened the available data in the way that they did, we felt that there was more data available than they did use in the report, for example.

But I think you've pretty much captured it, John.

DR. MAURO: Thanks, Bill.

DR. NETON: Okay, well I appreciate being in a position where an estimator thinks our numbers are too high. That doesn't happen very often.

CHAIR MELIUS: No, it's actually both -- both ways, too high and too low. So take your pick. You can start with either one.

DR. NETON: Well, I thought they

felt that their numbers were bounding, excessively bounding.

CHAIR MELIUS: On the front end. On the back end, we're not quite sure what to do with the back end problem.

DR. NETON: But on the front end of the issue, where they're too high, I think specifically the amendment for the covered AWE talks about, if a non-covered source of ionizing radiation to an atomic weapons employer is not distinguishable from a covered related source, then the non-covered source shall be treated as part of the radiation dose received by the employee. So I think we're bound.

We can't determine which portion of that is related to the cover operations, then we just include it all. And that's required by law. So even though we admit that it's higher, we can't distinguish between which magnesium thorium alloy was related to operations, and which was commercial, so we just said it's all.

MR. THURBER: Well, excuse me, this is Bill Thurber. If it's clearly identified as to how much magnesium thorium alloy was shipped to Mallinckrodt in 1957 and 1958, and how much magnesium thorium alloy Dow produced, I'm not sure why you say that.

MR. MAHATHY: For one, we don't know if that's all of it.

CHAIR MELIUS: Mike Mahathy, speak up more loudly.

MR. MAHATHY: You know, there's indications that Dow might have shipped, although it hasn't been shown, may have shipped magnesium thorium to the Rocky Flats and to other sites, so we can't say --

MR. THURBER: But the issue about magnesium thorium alloy to Rocky Flats was reviewed in the previous report.

MR. MAHATHY: I know we don't want to go there. I'm just saying --

MR. THURBER: So there is no basis for it.

MR. GUIDO: Well regardless, how would you propose to scale it then? This is Joe Guido. I mean, I agree in principle, but how would you propose to scale it in a way where everyone will agree to the scaling?

MR. THURBER: Well, as I say, we know how much was shipped to Mallinckrodt from the purchase orders.

MR. RUTHERFORD: So what Bill -- this is LaVon Rutherford -- so what, Bill, you are saying is, is we take that percentage versus the amount that was produced by the facility in roughly that same year or 1960-61 and we say that percentage is --

MR. THURBER: No, in the same years that it was produced.

MR. RUTHERFORD: That's what I'm saying.

MR. THURBER: In `57 and `58, yes.

MR. RUTHERFORD: Yes, and then you are saying then we would take that fraction percentage and apply it to the intakes that

we've already applied and drop the intakes by that amount.

MR. THURBER: Basically.

DR. McKEEL: Dr. Melius, this is Dan McKeel, may I make a comment?

CHAIR MELIUS: Yes, brief, Dan, go ahead.

DR. McKEEL: Well, my brief comment is, let's table this discussion completely apropos what the law requires is the production period for thorium alloy did not stop in 1958. And so the residual period did not start for thorium in 1958 either.

So the production of thorium alloy of the same type that was used in nuclear weapons work as certified by DOE continued on for many years thereafter. And that needs to be considered as well in the dose calculations.

CHAIR MELIUS: I think we're bound, for this discussion -- you know we recognize that there are open questions about that. But I think for the purposes of what NIOSH is doing

now, they have to stay with what are the covered periods and do that.

And that's why I want to stay focused on this report. If covered periods change, then things will have to be adjusted accordingly. And we're not speaking one way or the other about that specific issue but trying to deal with the technical issues related to whether or not the doses can be reconstructed during this period, given what is, you know, what we have now and what is, you know, allowed, you know, legally in terms of what NIOSH is allowed to do.

DR. McKEEL: I understand that. The point I'm trying to make, though, is that what you all are talking about as residual period and covering the doses is that, during the uranium residual period, thorium was still being produced, whether you call it the covered period -- it's outside the covered period, but it's during the residual period. And thorium was still, during the covered period -- the

residual period for uranium, but thorium was still being produced.

CHAIR MELIUS: But not for an atomic weapon that has been shown, demonstrated, or evidenced, Dr. McKeel. Not for use in atomic weapons.

We have a confirmation from DOE and DOL that those two years are the only time periods that we are to consider thorium production activity.

DR. McKEEL: I understand. And you are -- I understand that everybody has chosen to disbelieve the Rocky Flats story from 11 Dow workers. So I just wanted to make that comment. And that's all I want to make.

CHAIR MELIUS: Okay.

DR. McKEEL: Thank you.

MEMBER ZIEMER: Jim, this is Ziemer.

CHAIR MELIUS: Yes.

MEMBER ZIEMER: Could I ask a question here?

CHAIR MELIUS: Yes, certainly, Paul.

MEMBER ZIEMER: This question, I think, is either for Jim Neton or for SC&A. Is there an assumption that the -- assuming there is some ratio of weapons versus non-weapons work, I think SC&A was suggesting that it be scaled proportionately.

But are they making the assumption that the development of or the generation of contamination was the same from all these processes? That is the weapons-related activities and the non-weapons-related activities? It seems to me that's the assumption --

DR. MAURO: Paul, yes --

MEMBER ZIEMER: -- that would be open to question.

DR. MAURO: -- yes, Paul, I would say that we did not make that recommendation or finding. The only finding we have is that based on production, we know that the alloy --

thorium alloy produced for weapons was a small fraction of one percent of the total amount of thorium alloy produced at the facility during the covered period.

MEMBER ZIEMER: Yes, I'm just saying it doesn't necessarily follow that one percent of the contamination was.

MR. THURBER: No, this is Bill Thurber. May I amplify what John said? The materials that were sold to Mallinckrodt that might have been used for weapons were the same materials that Dow was producing for commercial customers. They were commercial alloys.

So you would think that the kind of contamination from producing whatever it was -- HK21 sheet or something -- whether that sheet went to Mallinckrodt for a weapons application or whether it went to some commercial customer for use in aircraft or whatever, that the relative amount of contamination would be the same.

MEMBER ZIEMER: Okay, that's really

what I was asking.

MR. THURBER: Those were not special materials --

MEMBER ZIEMER: Okay.

MR. THURBER: -- that went to Mallinckrodt.

MEMBER ZIEMER: Okay, they were the same processes is what you're saying.

MR. THURBER: Right, yes.

MEMBER ZIEMER: So it's just a matter of who the final product went to.

MR. THURBER: Yes.

MEMBER ZIEMER: Okay. That helps clarify that question. Thank you.

CHAIR MELIUS: Jim Neton has a comment to that, Paul.

DR. NETON: Yes, someone from ORAU might correct if I'm wrong here, but I'm not sure that we really know the total production of magnesium thorium alloys that Dow actually produced for DOE. I mean we have evidence of a couple purchase orders that establish the fact

that they did produce this material and shipped it to Mallinckrodt. But that just established the minimum amount of material that was produced for DOE or AEC.

So how do we really know how much of that total material was produced for DOE operations? I say we don't. Then we're just guessing if we try to scale the values.

MR. THURBER: But that's the only material -- the only material that -- isn't it true, I may be wrong, this is Bill Thurber, again, and please correct me if I'm wrong, but isn't it true that the only material that DOE has said was used for weapons was the material that went to Mallinckrodt in 1957 and 1958?

DR. NETON: I don't think that's true.

MR. RUTHERFORD: Yes, I think, Bill, I think what they've said is, that is what has gotten them -- the thorium activities in the door. But I don't think that they've said that, you know, those two purchase orders

were it. This is LaVon Rutherford, by the way.

I think it is true, and I'm not disagreeing with you at all, but we did review all of the purchase orders that were in that 700 pages of documents. And these were the only materials that did go to Mallinckrodt.

All the rest of the stuff that went to Mallinckrodt was not related to magnesium thorium alloys. It was related to other Dow products.

CHAIR MELIUS: My comment would be that given the amendment and what NIOSH is obligated to do, I think there is a pretty high bar in terms of showing, you know, adopting the approach that SC&A is proposing here. I think NIOSH would have to be very certain that they would have complete information --

MR. ELLIOTT: To scale it back.

CHAIR MELIUS: -- just to scale -- in order to scale. And, again, while it may be a valid point in terms of making sort of general estimate, I think given that amendment

and given the circumstances, I think they would be hard pressed to come up with the circumstances where NIOSH would be absolutely certain or have a high degree of certainty in order to be able to use that kind of scaling.

MR. ELLIOTT: The weight of the evidence is not there.

CHAIR MELIUS: Yes, right.

MR. ELLIOTT: Just like it's, you know, we hear the workers talk about shipments to Rocky Flats, but the weight of the evidence is not there either.

DR. MAURO: So what I am hearing is that you are saying that it is plausible that it all could have been --

DR. NETON: We don't know where to draw the line. And if we can't know where to draw the line, we just --

MR. ELLIOTT: Like the law says, if it's not discernable, we can't distinguish.

MR. GUIDO: You know, we're not commenting on plausibility there. There is Joe

Guido. We're commenting on the indistinguishability. I mean we know that there is some other level but the question -- it's like the start of the question, who is going to pick the number? And who is going to agree on the number?

If we agree on ten percent or 11 because, you know, those factors are going effect -- at some point, it is going to effect someone's compensability. You know, whatever number you pick, so, you know, that's where our case is.

DR. MAURO: We find ourselves in an unusual circumstance. You know we're interpreting and perhaps we shouldn't be, but the plausibility issue has come up before, and it will come up again.

And I guess the way in which plausibility is defined in its broadest -- you are defining it in its broadest sense right now, that is if we really can't place an upper bound on it, we'll assume it is all. Even

though we know it is implausible that it was all.

DR. NETON: Right. But that is following the regulations. I mean we're not making this up. I mean we're following the law.

CHAIR MELIUS: I think this is a different plausibility than the plausibility, sort of, dose reconstruction and so on. I think this is how do you interpret that specific statute and amendment?

And so I think we just sort of approach it differently and not try and put it in the context of the other. And I think the wording is such that I think it is hard to do anything other than what NIOSH is doing.

DR. MAURO: Then there is the back end of it. Now we go to the back end of the problem and Bill, please, again, as a reminder, our concern is that the way in which this curve of residual exposure is built is very much in accord with -- well, at least one of the steps

recommended in OTIB-0070 whereby you sort of pin down what is at the back end of the potential exposures, the low end.

And one of our concerns was that the way that was constructed had numerous assumptions embedded in it that were questionable, that were questionable in terms of, well, we put to bed the front end problems.

So, therefore, we're not -- we are concerned in that maybe the cause there was decontamination that took place prior to those measurements, the place you are pegging the number now at the bottom end might be too low and maybe was higher.

MR. MAHATHY: There also was a survey done in 1989, which Bill alluded to, and the highest thorium dose sample was like seven picocuries per milligram. And if you calculate that out, it comes out to 1,700 picocuries per year, which is actually lower than the dose we calculated using the other method, which is 2,100.

So even using data that we have previous to 2006 actually gives you the lower intake. Now we also have -- since then, you know, we have all the data, you know, from the contamination survey that was done in 2006. So those are -- you know, I feel like the intake we calculated in 2006 is actually higher than what it would have been because remember they were in there vacuuming and stirring it up.

We only have to calculate what people would have gotten from residual, not from some action of the thorium. So if you assume all the thorium was fixed there and, you know, basically would have been the same pretty much over time, it would have been higher when they were disturbing it.

CHAIR MELIUS: Go ahead.

DR. MAURO: I guess our concern is that what was measured reflected post-decontamination and not pre-decontamination.

MR. GUIDO: It turned out that the decontamination in 1989 -- I'm just trying to

get the scope -- where is the decontamination we're talking about.

DR. MAURO: I'm zeroing in at 2006 now.

MR. MAHATHY: Right. There is 20006, and I didn't allude to the 1989 data, which is actually less than the 2006 data.

MR. RUTHERFORD: That is correct. This is LaVon Rutherford. That is correct. The 2006 data is actually higher than the 1988-89 data.

MR. MAHATHY: Which tends to suggest that the material was disturbed, and then they had higher readings.

MR. RUTHERFORD: The reason, John, the reason that we moved to that was because we had that data in 2006. And that was actually perimeter data that was used around the -- we knew that the cleanup activities, based on the Cushman or the closure report, that the cleanup activities, the workers inside that area were in respiratory protection and they used

boundary samples.

We used the perimeter samples to actually say that the highest exposed person that would not have been working in that area would have been exposed to that air data.

And then we used that air data and actually compared it to the `89 data and we said, well, we know this is bounding. And we'll go ahead and use this in the exponential approach.

MR. THURBER: I think -- yes, I understand exactly what you're saying. I think that the comment in our report was that the 2006 data were taken during the cleanup of overhead beams that involved vacuuming and other manual removal processes.

And our comment was that that would hardly seem to be representative of what the real residual contamination endpoint ought to be for an exponentially-declining function. I think that's the point.

MR. RUTHERFORD: Well -- this is

LaVon Rutherford -- then, Bill, it's more than that it could be over-estimating -- it could be implausibly high if you take into consideration what you just said.

MR. THURBER: Yes.

MR. RUTHERFORD: I mean it could be both ways. So our situation was we had this data in 2006, and we felt like okay, to be a good bounding exposure, we're not just going to throw this data out. We're going to consider this data.

And we took that air data and we actually compared it to the `89 data. It was higher. We could have went back and said well, let's just use the `89 data, but we didn't because we didn't want to have to argue the point of well, which is right and which is wrong here.

MR. THURBER: Right.

MR. RUTHERFORD: And so that's why we went that way.

MR. MAHATHY: I might also add that

within those reconstructions for four different cancers using 40 years of employment, they are all within the realm of plausibility. And we can share the information. So --

DR. NETON: I think what Mike is saying is we've done some examples of dose reconstructions using some metabolic and non-metabolic cancers. And the values aren't ridiculously high to where, you know, these are implausible exposures.

MR. MAHATHY: Colon cancer was 33.25 percent of CLC --

DR. NETON: That in and of itself doesn't say too much other than the fact that they are not astronomically high. One could still argue that they are on the high end for a residual period, I suppose. But now I'm hearing -- John started off saying that they were too low. And now I'm hearing Mike Thurber saying that they are too high. So I'm not sure where we are.

DR. MAURO: I know we agreed --

when we walked away from the back end of the calculation, we had what I would say contradictory concerns. In one respect, we were operating on the assumption that the material was cleaned up before. So, therefore, it is really not what the residue is.

We were also concerned, but wait a minute, whatever the residue was, probably only a very, very small fraction was from weapons-related activity.

And then finally, offsetting that further, is you are cleaning up and you were stirring the stuff up, that's not what you would have during a residual period. That was during the D&D period when you were generating aerosol.

So, you know, we have all -- I guess it becomes, you know, we're in this place where we tried to look at this as a scientifically plausible way of modeling something. And we found right from the front end to the back end in our approach to really

stress what we would consider to be a scientifically valid and plausible approach.

Nevertheless, within the definition of plausibility, as embraced by NIOSH and apparently around the board, I guess our concerns really are misplaced. I don't know -- I mean I'm hearing answers that sounds like that is okay.

MR. MAHATHY: I just -- one other problem. If you look at the `89 and the 2006 data, that really within the margin of error, they were the same.

DR. MAURO: Well, as far as SC&A -- I mean I'm going to withdraw at this point. We've done the best we can to sort of put a light on how you did it, where we think there might be weaknesses scientifically in the assumptions and the approach.

I think you understand what they are. And really I don't know how much more we can add other than some of the -- there are some what I would call second order issues

related to the data that you started with, its completeness. But that's really secondary to what we're talking about.

MR. MAHATHY: And I wanted to say we used only samples, only results from Madison. We did not use results from Bay City or Midland, and the earlier results, `56 and `57. And there were some in `58 that were from Midland and Bay City.

We only used results from Madison that we considered general area.

DR. NETON: Mike, could you just clarify for me, what were the general conditions around when the 1989 samples were taken? What was the pedigree of those samples?

MR. MAHATHY: It was done by ORAU.

DR. NETON: Right. So these were sort of just not disturbed samples. They were more of building operations.

MEMBER GRIFFON: And those were, you said, picocuries per milligram -- picocuries per gram?

CHAIR MELIUS: Yes, what was it?

MEMBER GRIFFON: What were the --

MR. MAHATHY: Actually those were stored by results and we converted them.

MR. GUIDO: Well, the one that you are talking about is picocuries per gram.

MR. MAHATHY: Seven picocuries per gram.

MR. GUIDO: I heard milligrams.

MR. MAHATHY: Oh. Sorry.

MR. RUTHERFORD: If I remember correctly, Mike, correct me if I'm wrong, this is LaVon again, that 1989 survey was a preliminary survey to get in basically stagnant conditions in preparation for future D&D. Or future remediation.

DR. MAURO: So this is like a standard Morrison site characterization prior to clean up. And now were you measuring airborne dust loading or surface contamination level?

MR. MAHATHY: That was surface

contamination only. And we, you know, I converted -- I just used the simple, you know, converted -- I had factors and I converted it to an airborne --

DR. MAURO: Ten to the minus six?

MR. MAHATHY: Yes.

DR. MAURO: Then we're back to the ten to the minus six resuspension factor. I mean this is closing down to -- I mean where we are right now, from what I see, then it becomes a matter of how did you peg the back end and you're saying you pegged the back end, assuming all the residual activity that was there --

MR. MAHATHY: That was in `89 only.

DR. MAURO: -- was -- is an upper bound.

MR. MAHATHY: Right.

DR. MAURO: Because you are assuming one, it was all weapons-related, what you are looking at, and that the material was based on what was measured on surfaces.

MR. MAHATHY: Yes.

DR. MAURO: And then you -- well, I guess the only thing that I would point out is then you applied the ten to the minus six resuspension factor and that would you give you -- peg your lower end --

MR. MAHATHY: Yes.

DR. MAURO: -- of 1980 -- well, let's say, 2006 number of a certain level of number of becquerels per cubic meter. During -- we have lots of literature that says during operations, the air dust loading would have a resuspension factor that might be at least two orders of magnitude higher than that.

MR. GUIDO: Can I --

CHAIR MELIUS: Go ahead.

MR. GUIDO: Well, I wanted to say we're kind of mischaracterizing a little bit the 1989 data because there was a lot of data there and a lot of different ways to look at that. I mean if we're trying to say that, you know, we agree our upper bound is high and our lower bound, which is based on air data may or

may not be high because we're trying to say well is that really the right number because there was some decon done before.

And if you trace that back to 1989 and say, okay, is -- you know based on that curve, is the `89 point right because the `89 data is undisturbed. I mean there's a lot of ways to look at the --

DR. MAURO: But it's surface data.

MR. GUIDO: Well, yes, but as I say, there's a lot of ways to look at the 1989 data.

DR. McKEEL: This is Dan McKeel, may I please make a comment about the 1989 data?

CHAIR MELIUS: No, not right now, Dan. Let him finish first.

MR. GUIDO: Yes, let me finish my point. What I'm saying is there are a bunch of ways to characterize it. And one way is they actually went up in the dust in the rafters and calculated the specific activity of the dust.

It was seven picocuries per milligram. Okay, that was in the dust.

DR. MAURO: Okay.

MR. GUIDO: So now if you want to look at what the 1989 intake projected by that curve is and you want to look at what dust loading based on seven picocuries per milligrams would cause that, you're going to be up around 120 milligrams per cubic meter, which is very high.

So that framework kind of gives you a -- we're still high in my opinion. We're not using the ten to the minus six. I mean because that, to me --

DR. MAURO: Oh, you didn't use that then?

MR. GUIDO: Well, we didn't use that data at all. I mean we're not using that data at all. I'm just saying if you are trying to -- if we went back -- if you said go back and look at the `89 data and make us comfortable that that `89 data shows us the

curve is right, what I'm saying is we could do that based on mass load.

DR. MAURO: Yes, if you have a mass loading approach that you could peg the back end with, given the --

MR. GUIDO: Right.

DR. MAURO: -- this is all, you know, as we discussed before, rather than the resuspension factor approach -- but I'm saying --

MR. GUIDO: It's hard to disagree on that. Once you get there, and if you are in the milligrams per cubic meter range, you have certainly placed an upper bound on the back end of that.

MR. MAHATHY: It is actually higher than the one we have now.

MR. GUIDO: So maybe we should, you know maybe one way to get through this is for us to do that to show you -- I mean because I think -- well, it's not hard. You know seven picocuries per milligram was what was in the

rafter dust.

So, you know, to get to -- you can look at the intake that is projected in that year. What's the number? I actually did this calculation because I thought this was going to be an issue -- 18.9 dpm per day in 1980. What is it in 1989? What is the data in 1989? I have the matrix right here -- 7.7 dpm per day.

So basically what we're saying is what does it take to get to 7.7 dpm per day from seven picocurie per gram material.

DR. MAURO: Is that milligrams per cubic liter?

MR. GUIDO: No, I know, I'm just saying that's the process to do it. I'm not saying let's do this right here. But I'm saying this is the process we can do and we could see what the number comes out to. If it is in the milligrams per cubic meter, we're not going to argue, right? I mean --

CHAIR MELIUS: Now, Dan, you had a comment on the `89 data?

DR. McKEEL: Yes, my comment was that 1989 was a very limited survey of only one building, the extrusion building. And there was zero survey data from building five or seven where the rolling mill was and where the pot room were.

And so the Pantel later report, the D&D reports in 2003 through 2008 covered the entire plant. So the 1989 data can't be the sole representative because it is one spot in this great big building complex. Thank you.

MR. MAHATHY: That is another reason I used the 2006. But they were still very consistent.

CHAIR MELIUS: Did you hear that, Dan?

DR. McKEEL: I heard --

CHAIR MELIUS: The response.

DR. McKEEL: -- I heard that it was used in 2006 for some reason but not why. I mean, 2006 should be more representative of the total plant.

MEMBER GRIFFON: That's what he said, yes.

CHAIR MELIUS: That's basically what he said.

DR. McKEEL: Okay.

CHAIR MELIUS: That's why they used both and essentially used the 2006.

DR. McKEEL: Okay. I will also mention, you know, that there was previous decontamination work, of course, in 1993 of the thorium magnesium waste that was outside of the building. So you all are aware of that as well. Thank you.

DR. MAKHIJANI: I didn't participate in this, but just to raise a question.

CHAIR MELIUS: Speak a little bit louder, Arjun.

DR. MAKHIJANI: This is Arjun. Is there an ingestion component to this also?

DR. NETON: Yes. Another comment.

DR. MAKHIJANI: This is my last

comment.

DR. MAURO: Yes, but I think we were in the place that I think is really the core of the concerns. There are ingestion issues. Modeling issues we've had on many occasions.

DR. MAKHIJANI: Yes, right. That's why I was kind of remembering it as being there before.

DR. MAURO: And, in fact, the ingestion pathway is almost linked to the inhalation pathway in the models that were used by NIOSH.

We're really -- now we are at the point where we are questioning whether the inhalation is good. And let's say it turns out that everyone is comfortable with the inhalation but then the ingestion becomes a tractable issue.

DR. MAKHIJANI: Yes.

DR. MAURO: Right. That goes --

DR. NETON: Exactly, which we've

already agreed it's a tractable issue.

DR. MAKHIJANI: All right now. I'm sorry, I'd forgotten that.

CHAIR MELIUS: The other findings, do you want to go over those please.

MR. MAHATHY: Yes.

DR. NETON: There was an external dosimetry question.

DR. MAURO: Right. It was an external. And Bill, you're going to have to help me out a bit here because when I was refreshing my memory on this, I focused in on the matters we just discussed.

MR. THURBER: Right.

DR. MAURO: How are you on the thorium and the external? Are you current on those two aspects of our sets of findings?

MR. THURBER: I'm sorry.

DR. MAURO: Well, let's start with external because we broke our report up into several sections.

MR. THURBER: Right. Well, we had

some questions about thoron that were basically related to the fact that we didn't understand the basis for the data selection, as I recall. We thought that there were a number of general area samples that NIOSH did not include in their database, and it wasn't clear to us why.

MR. MAHATHY: They were not from Madison. They were taken from Midland.

MEMBER ZIEMER: Are you talking about -- this is Ziemer -- are we talking about Finding 5 on the thoron measurement?

CHAIR MELIUS: Yes.

MR. THURBER: Yes, that's what I was talking -- this is Bill Thurber -- that's what I was talking about anyway.

DR. NETON: Yes, our response is, basically, that we've used all the data that were available at the Dow Madison facility.

MR. THURBER: Okay. Obviously, it would have been helpful if that -- if those distinctions were made in the report. The other point we had -- we had some trouble

actually -- and it may be our guys don't do their calculations right, but we could not duplicate the 95th percentile calculation.

MR. MAHATHY: That was an error. And that was my fault. And your calculation was correct.

MR. THURBER: Okay. Well, then what that says is that the 95th percentile value using your database would be about 35 percent higher than what you reported.

MR. MAHATHY: This has almost no effect on that.

MR. THURBER: Okay. And, again, it would be helpful to -- I would have to go back and try and look at all the data that I mentioned in our report to see if we are in agreement that some of the data was from Bay City.

DR. NETON: I also see here, Bill, that there's a note on one of our responses that we did not include process area samples.

MR. THURBER: No, no. We

understood. That was very clear in your report. And we also tried to, in examining what we thought was the relevant dataset to --

DR. NETON: Okay.

MR. THURBER: -- to exclude process samples as well. So conceptually, we're in total agreement on that point.

DR. NETON: Okay.

MR. THURBER: So I guess then as far as the thoron is concerned, the question is, is whether -- if we took our dataset and reexamined it whether we would be in agreement that the -- that you people had only used the Madison and we had used stuff that went beyond Madison. And we apparently are in agreement that the 95th percentile value is as reported in our focused review.

DR. NETON: Correct.

DR. MERRITT: This is Dr. Maureen Merritt. I'm just joining the conversation here. Thank you.

MR. KATZ: Can you repeat your name

as long as you --

DR. MERRITT: Dr. Maureen Merritt --

MR. KATZ: Maureen Merritt.

DR. MERRITT: -- here at Los Alamos.

MR. KATZ: Thank you.

CHAIR MELIUS: How about Finding No. 6?

MR. THURBER: Finding No. 6, that -- oops, excuse me --

DR. MAURO: That's the external question?

CHAIR MELIUS: Right. Yes, .7 MR per hour.

MR. THURBER: Yes, I think that -- well, Finding No. 6 was ingestion, which we've already talked about.

DR. MAURO: No, number seven.

MR. THURBER: Finding No. 7 --

CHAIR MELIUS: Was ingestion.

DR. MAURO: That was ingestion.

Number six has to do with -- if I recall, number -- yes, external, the .7 MR per hour, Bill, if you would correct me if I'm wrong now that it is coming back to me from reading this, it was based on the assumption that a person was standing some distance away from the alloy, the pure alloy, the four percent alloy, thorium alloy, all the time.

And this really was not appropriate, if we're talking about exposure to residual material that might be on surfaces. Again --

MR. THURBER: That's correct, John.

DR. MAURO: -- again, a gross overestimate of what might have been the external exposures a person might have experienced from the residual period. I think that was our concern.

MR. THURBER: Yes.

CHAIR MELIUS: By the way, for those of you that are confused, Finding Six and Seven are reversed in the body of the report

versus the executive summary.

DR. MAURO: Is that right? My apologies.

CHAIR MELIUS: I'm looking at the executive summary.

DR. MAURO: I'm guilty then.

DR. McKEEL: Can I please point out that the Pantel reports documented that not only was there thorium dust on surfaces but there was amounts of thorium metal products of various kinds scattered around all of the three main buildings at Dow. I showed that to the board in May of 2007.

CHAIR MELIUS: All right.

DR. McKEEL: Thank you.

DR. NETON: Along those lines, then, our response would be similar to what we said for the others. It is indistinguishable from commercial -- commercial operations and AEC operations are indistinguishable in this time period. So we just went with the higher dose.

DR. MAURO: I think that's it.

CHAIR MELIUS: Yes. So I think that, regarding the SC&A Addendum 2 report we were going over, I think some written response from NIOSH would be helpful. I think there is -- mainly I think a clarification on this residual period commercially, that issue I can see where it is confusing to people. And I think that would be helpful for future and so forth.

And then I think the clarification on the inhalation dose, the choice, what we talked about doing would be also helpful in terms of the justification.

But I think it makes sense as you present it.

MEMBER GRIFFON: Including the `89 --

MR. GUIDO: Right. Yes, that item isn't really embodied in the one through seven findings. Where would you want to see that? Or is this a separate item?

In other words, findings one through seven really don't --

DR. MAURO: Yes, it's in the text but it's not in the findings.

MR. MAHATHY: It's in the text.

MEMBER GRIFFON: So if we respond, does it need to be just a separate item or --

MR. MAHATHY: I think it would fit under one of these findings.

DR. McKEEL: Doesn't it fit -- actually it fits under the finding that is associated with the questions with the 2006 data that we used.

MR. GUIDO: Right. Number three. Okay.

And I showed -- my back of the envelope calculations, it is 50 milligrams per cubic meter is what you would need, which is off the charts.

MR. ELLIOTT: It's pretty high. You couldn't see through it.

DR. MAURO: We don't go there. I

can tell you as an industrial hygienist, you can't see through it.

CHAIR MELIUS: Some of us will question how well industrial hygienists can see, smell --

(Laughter.)

MR. ELLIOTT: I can't imagine it looking that way every day. People wouldn't put up with it.

CHAIR MELIUS: Okay. That completes, on this particular issue, I think it is just getting response back. And I don't -- Dan, do you want to give us an update -- or Larry, there are still some outstanding Freedom of Information Act requests, and I'm just trying to get -- trying to think how we schedule dealing with this SEC in terms of where we are.

I'd like to make sure that we, you know, to the extent that, you know, we answer, they answer promptly. And that Dan and the petitioners have access to all the necessary

information they need to evaluate this. So can you -- can somebody update us?

DR. McKEEL: I can try to.

CHAIR MELIUS: Okay.

DR. McKEEL: We have sent several FOIA requests. The first was in April of 2007, soon after the original evaluation report surfaced. And that had 14 -- I asked -- actually what I sent Larry Elliott was 14 questions, eight of them, I think, were made into FOIA requests.

We've gotten answers back from all but Item 9. And we still await that.

Then in March -- on March 30th of this year, we sent a FOIA request for additional Dow information, particularly about -- and revised that in May and updated it -- and particularly we were looking for the information that Larry had indicated.

He sent a letter to Dow headquarters seeking information about thorium during the residual period. And that was

primarily aimed at getting that letter to Dow headquarters and any information that Dow had sent back in return.

I didn't get an answer back from that at all. So in June I filed a FOIA appeal, and that worked its way through the process. And eventually I wound up with documents that were said to be responsive to all three of the main items I sent a FOIA about.

But none of them were the documents that was received from Dow headquarters. And I also mentioned in my revision and in the appeal that one of the reports, I think it was the Addendum 2, had mentioned that in the database there were 62 items from Dow headquarters that were received or that were placed in the SRDB January 9th of this year. And that was long after the other Dow materials that we sent -- that were sent to us in last August of `07.

So I thought they must be different documents. And anyway, I went through a long deal with both FOIA offices, the CDC FOIA

office and the Public Health Service Appeals Office and I never have gotten any of those documents requested from Dow headquarters. So I consider those still outstanding.

And then PHS wanted to make one element of the appeal -- I think it may be those documents -- they wanted to convert that into a brand new FOIA request. And nothing has been acted on with that.

So there are several items like that that I still would like to get. I also, you know, of course, would like to have the, I assume that SC&A may be tasked, or the new contractor, to make comments on the new Appendix C.

And, of course, I'd like to have those when they come out. But I must say there are all sorts of reports that this workgroup has not really -- I made a list for myself with 20 document groups that pertain to Dow. And so I do wonder if those things are going to be reviewed as well. But the FOIA thing, I'm just

-- I'm waiting for those.

There is one bit of information I would like to convey to you all and just mention that I can send that this afternoon by e-mail, but I obtained a final -- the letter that Illinois Emergency Management Agency, the Nuclear Safety Division, sent to Spectrulite Corporation's CEO, Chris Barnes, on June the 9th of this year, which finally terminated the Spectrulite thorium license. So that did finally bring closure to the thorium operations all together at that site.

CHAIR MELIUS: Okay.

MR. RUTHERFORD: This is LaVon Rutherford. We do have a copy of that, Dan, that final letter.

DR. McKEEL: Okay.

CHAIR MELIUS: Does anybody from NIOSH have a response on the FOI situation?

MR. ELLIOTT: Yes, it's with the FOI Office. I mean there's --

MR. KATZ: But didn't you have some

interaction with Dr. McKeel about what letters were actually -- his question about letters to the headquarters, Dow, whether you ever received a response or not. I thought you guys had some interaction about that recently where you said you never received some documents. Or am I mixing this up with another facility?

MR. ELLIOTT: There is confusion around this. I never said I sent a letter to Dow headquarters. I said NIOSH was looking at sending a letter to Dow headquarters.

In fact, I think the letter that was sent to Dow headquarters went out under Stu's signature. And this is all part of one of Dr. McKeel's FOIA requests that is being handled by the FOIA office.

I did write a letter to the State of Illinois. And I got a response from them. And I sent them a thank you letter for that. And I think that is also involved in one of Dr. McKeel's FOIA requests.

But, you know, these --

DR. McKEEL: Well, all I can comment --

MR. ELLIOTT: -- when Dr. McKeel has -- when you have a FOIA request like you submitted over the weekend for one specific document, that's very easy to process through the FOIA office. I simply take that e-mail as a request for that document and we process it as a FOIA request, as you've seen me do this morning, Dr. McKeel.

But when your request is broad and expansive and changes over the course of a few months, that causes the FOIA office difficulty in preparing a response. It causes us difficulty in understanding what the FOIA office wants to review in order to make decisions about provision.

And so that is what is taking a lot of time on some of the outstanding FOIA requests. They are very voluminous. They are very expansive.

They have changed or morphed over

time. And, you know, that's in the hands of the FOIA office. I have no ability to figure out, you know, how to speed that up or what to do about that.

DR. McKEEL: Well, I've tried to do everything I know. All I can say is that FOIA requests, the way I see them, are a loop. The reason you can't -- you can't send them to me directly. But you have the documents that I am requesting, I believe.

And so I send a request to the FOIA office. They receive it. And then presumably they come back to you -- that's what they said they have done -- and ask for those documents. And then you send them to them or not. And then they send me the documents or not. And provide an explanation.

And so I'm saying that there was one item that hasn't been contested, Item 9 from April 2007 that hasn't been answered. And so --

MR. ELLIOTT: What is Item 9, if

you can refresh my memory?

DR. McKEEL: I think it is about correspondence between NIOSH and ORAU concerning the evaluation report. I don't have it in front of me right at the moment.

MS. HOMOKI-TITUS: Larry, this is Liz Homoki-Titus. I think that is the one that has, like, four or five hundred pages of response that the office is trying to go through and we're trying to help them speed it along. But I mean it is a very voluminous response to a very, kind of, broad question.

DR. McKEEL: Well, I understand that. I will comment that the FOIA office has never asked me to narrow that scope. So all I know is that, you know, it is 17 or more months afterwards and I still haven't gotten the document. So voluminous or not, I don't think the FOIA request discriminates against that.

MR. ELLIOTT: There are certain protections to certain types of information that, you know, may not be allowed to be

provided to you.

DR. McKEEL: Oh, I understand that. But I think in 17 months that could be so indicated, you know.

MR. ELLIOTT: I agree. I would not disagree with that at all.

DR. McKEEL: Yes, yes. No, I understand the rules.

Well, that's all I can say.

CHAIR MELIUS: Okay.

MR. RUTHERFORD: Dr. Melius, this is LaVon Rutherford.

CHAIR MELIUS: Yes?

MR. RUTHERFORD: I wanted to also -- there was a question that Dr. McKeel had concerning the end date set for Dow. And I wanted to point out that Appendix C of the Patel 6000 identifies November 30th, 2007 as our end date. And that is what we are moving forward with in our residual contamination report.

DR. McKEEL: Well, don't you -- my

understanding after the June meeting was that you would communicate that information to the Department of Labor. And then they would know that.

MR. RUTHERFORD: I think we told you at that time, too. And Larry is in here and he can pipe up on this as well, that the only thing the Department of Labor is going to recognize is the residual contamination report when it comes to changing covered period.

I'd also like to point out the fact that the original covered period ended at the 1998. Right now we have no claims that are potentially affected from 1998 to 2007.

Now I do recognize that there are going to eventually be claims. But right now we are working all dose reconstructions and all claims that we have, we are working them through. And that none of them are affected by that end date.

And our existing dose reconstruction model under Appendix C allows

for any that come in that, in the future, from 1998 to 2007, we'll be able to handle.

MR. ELLIOTT: We anticipate the residual report to come out soon. We are working through a review of the draft of it now. So it is imminent.

CHAIR MELIUS: Thank you. You answered my question already.

Okay. Thanks. Okay. If not, I think we can end the meeting. In less time than I thought. But that's fine. I won't argue with it.

Thank you everybody.

MR. KATZ: Thank you.

CHAIR MELIUS: And I'd like to thank the NIOSH rep for the ORAU people attending today. I think it is helpful to have people here and see some of these people we have heard from before.

MR. ELLIOTT: Happy they could help us and be here, too.

CHAIR MELIUS: Okay. So thank you

all. And talk to you soon.

(Whereupon, the above-entitled matter was concluded at 12:03 p.m.)