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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TBD-6001 WORK GROUP

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THURSDAY
NOVEMBER 4, 2010

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The Work Group convened in the Zurich Room of the Cincinnati Airport Marriott, 2395 Progress Drive, Hebron, Kentucky, at 9:00 a.m., Henry A. Anderson, Chairman, presiding.

PRESENT:

HENRY A. ANDERSON, Chairman
MARK GRIFFON, Member*
R. WILLIAM FIELD, Member*

ALSO PRESENT:

TED KATZ, Designated Federal Official
NANCY ADAMS, NIOSH Contractor*
DAVID ALLEN, DCAS
BOB ANIGSTEIN, SC&A*
HANS BEHLING, SC&A*
NICOLE BRIGGS, SC&A*
JAMES EAST, SC&A*
MARY GIRARDO, Hooker Chemical*
SAM GLOVER, DCAS
RICHARD LEGGETT, SC&A*
JENNY LIN, HHS
JOHN MAURO, SC&A
JIM NETON, DCAS
GERALDINE PAGE, Hooker Chemical*
EDWARD PATTERSON, United Nuclear*
JOE PROVECCHIO, SC&A*
MICHAEL RAFKY, HHS*
BILL THURBER, SC&A

*Participating via telephone

C-O-N-T-E-N-T-S

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

9:05 a.m.

MR. KATZ: This is Ted Katz of the Advisory Board on Radiation and Worker Health.

This is the TBD-6001 Work Group, and we will begin with roll call before we go on the record, starting with Board Members of the Work Group in the room, with the Chair.

CHAIRMAN ANDERSON: Henry Anderson.

MR. KATZ: And please speak to -- we have four different sites that we're discussing today.

CHAIRMAN ANDERSON: I have no conflicts.

MR. KATZ: Speak to conflict, thank you. you don't have to list them individually, and then on the line for Board Members.

MEMBER FIELD: This is Bill Field, no conflict.

MR. KATZ: Thank you, okay, and no

Mark yet. The NIOSH-ORAU team in the room.

DR. NETON: This is Jim Neton, NIOSH, no conflicts.

DR. GLOVER: Sam Glover, NIOSH, no conflicts.

MR. ALLEN: Dave Allen, NIOSH, no conflicts.

MR. KATZ: And NIOSH-ORAU team on the line? Are you expecting any folks on the line?

(No response.)

MR. KATZ: Oh, okay. SC&A team in the room.

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

MR. THURBER: Bill Thurber, SC&A, no conflicts.

MR. KATZ: SC&A on the line.

DR. BEHLING: Hans Behling, SC&A.

MS. BRIGGS: I'm sorry, Nicole Briggs, SC&A, no conflict.

MR. PROVECCHIO: Joe Provecchio,

SC&A, no conflict.

DR. ANIGSTEIN: Bob Anigstein, SC&A, no conflict.

MR. EAST: James East, SC&A, no conflict.

MR. KATZ: Can you say that again?

MR. EAST: James East, SC&A.

MR. KATZ: James East. Welcome all of you, and then HHS or other federal officials or contractors to the feds in the room.

MS. LIN: Jenny Lin, HHS.

MR. KATZ: And on the line?

MR. RAFKY: Michael Rafky, HHS, no conflict.

MS. ADAMS: Nancy Adams, NIOSH contractor, no conflicts.

MR. KATZ: Very good, and then there are no members of the public in the room. Are there any members of the public on the line?

MS. PAGE: Yes.

MR. KATZ: Do you want to identify yourself or --

MS. PAGE: Geraldine Page, Hooker Chemical.

MR. KATZ: Geraldine Page, welcome.

MS. PAGE: Thank you.

MS. GIRARDO: Mary Girardo, Hooker, Niagara Falls.

MR. KATZ: Mary Girardo.

MS. GIRARDO: Right.

MR. KATZ: Okay, thank you. Welcome. Any others from the public?

(No response.)

MR. KATZ: Okay, and the Hooker, where's Hooker on the agenda?

CHAIRMAN ANDERSON: Hooker is third on the agenda.

MR. KATZ: Okay. So for Geraldine and is it Mary? So Hooker is the third item on the agenda. It will probably -- it's hard to judge how long it will be, but it will

probably be an hour or more before you get to.

CHAIRMAN ANDERSON: Oh, I think United Nuclear is going to --

MR. KATZ: Or many hours before we get to Hooker. Do you have a sense John?

DR. MAURO: UNC is probably going to be a little more busy than the others.

MR. KATZ: You think that's a couple of hours' worth?

DR. MAURO: And after that, maybe things will get settled into one hour each.

MR. KATZ: Okay. So it may be a couple of hours before we get to Hooker. You're most welcome to stay on for the entire Work Group meeting. I just wanted to give you that sort of heads up.

MS. GIRARDO: What should we do if we don't want to stay on?

MR. KATZ: So, you can sort of --

CHAIRMAN ANDERSON: Should we do that right after lunch maybe?

MR. KATZ: We could set a time, to

make it easy for them, since --

CHAIRMAN ANDERSON: Yes.

MR. KATZ: So we could say that we're going to get to that at 1:00.

MS. GIRARDO: For sure, 1:00 p.m.

MR. KATZ: Is it one or we'll say -- we could break at 12:00 and get to it at one.

CHAIRMAN ANDERSON: Yes, 1:00 would be fine.

MR. KATZ: All right. Would that make it easier on you folks?

MS. GIRARDO: That would be great, and what should we do when we return call, do the same thing?

MR. KATZ: Oh, you do the same thing. You call in just the way you did.

MS. PAGE: If we don't call back, we can obviously read the agenda, correct?

MR. KATZ: If you don't call back -

MS. PAGE: We can read the --

MR. KATZ: Oh, the transcript, absolutely. There will be a transcript to this. You'll get that when it gets posted.

MS. PAGE: Okay. All right. Thank you very much.

MR. KATZ: Okay, you're welcome.

MS. GIRARDO: Thank you. Everybody have a good day.

MR. KATZ: Okay, Henry. It's your turn.

CHAIRMAN ANDERSON: United Nuclear.

MS. ADAMS: Ted?

MR. KATZ: Yes Nancy.

MS. ADAMS: This is Nancy. You might just want to make the announcement about noise in the line, because there was a --

MR. KATZ: Thank you for reminding me, Nancy. So everyone listening on the line, when you're not speaking to the group, would you please put your phones on mute. Use your mute button. If you don't have a mute button,

press * and then 6, and that will mute your phone, and then press * and 6 again unmute your phone.

And also please don't put the call on hold at any point, but hang up and dial back in if you need to, because the hold will disrupt the call for everyone else. Thank you.

CHAIRMAN ANDERSON: So we have the matrix that was sent out for United Nuclear. I guess SC&A, you want to begin with your review of the --

DR. MAURO: Well there's, I guess, some development from the last meeting, and the matrix, everyone has it. Bill put together the updated matrix. It is dated October 20th, 2010.

Everyone should have that, and I believe the second package in there, so if you go a little ways in, begins the United Nuclear series of findings and our understanding of the -- what came out of the last Work Group

meeting, so it's summarized that way.

Bill, you put this together. You want to MC this, or you'll help me out as I go through, okay.

MR. THURBER: The fifth column over represents the three items that SC&A was tasked by the Work Group at the last meeting to examine, and we subsequently did that, and issued a report on -- in September, addressing these three items.

Our response to the three items that we were tasked by the Board to look at is in the last column on the matrix.

DR. MAURO: The way in which we organized this, and it's sort of -- it's good for me to get back, is that we broke the work up until a number of parts, different people work in different parts. The very first part we did, was as you recall, there was a 97 page SEC petition, a big one.

CHAIRMAN ANDERSON: Yes.

DR. MAURO: And it had a lot of

important points that needed to be addressed, and we collected all that and tried to summarize it.

So the very first item, and we actually don't have it here on the findings, but I think it's going to be important some place along the line, that we go over --

I think we boiled them down to six items that are of concern to the petitioners, and the degree to which we felt the Evaluation Report addressed those items directly or indirectly in the report.

So that's going to be -- so that's going to be like an overarching as we move through these things.

Okay. So with that, let's see if we could just catch up with -- the first one is a fairly straight -- we'll get there. I figure let me just start from the first box.

CHAIRMAN ANDERSON: Finding 1.

DR. MAURO: Finding 1, Finding 1. Finding 1 has to do with X-rays. We've been

there before, and this has always been in that little bit of ambivalent situation. Whenever you have a site, an AWE site, typically you folks assign the classic chest X-ray as being the dose, one per year, and do your dose.

Use OTIB-6 and come up with numbers, and we always match them. But we always ask the question, because it looks like it's a little unclear. Well, what about fluoroscopic examinations, photofluoroscopic examinations, which sometimes could be very high, I mean ten times or higher.

All we, I guess we're saying is there any reason to believe there were none. I guess I still have -- the position, NIOSH's position is basically a position that for AWEs, by definition, they're not there unless you see them, or by definition no, we're going to give them, unless we know they're not there. I guess we've been in that limbo state for a while.

CHAIRMAN ANDERSON: Did they have

the equipment at the -- if they didn't have the equipment, I think it's a safe bet, and some of these smaller sites are --

DR. MAURO: Yes, that would be an answer. I don't know whether that would be available, but it certainly won't be in the medical record when probably whether they had it or not.

MR. ALLEN: It usually just ends up if we get any information and that's what we use. The question has always been, I think, the default, when we have no information and it's not unusual we get no information about medical from a lot of these small companies.

CHAIRMAN ANDERSON: Yes, right.

MR. ALLEN: And the default had been that the photofluorography was essentially set up for like a mass production, scanning. I think it was really kind of for TV scanning is what it is mostly used for.

But some DOE sites started using

it for their routine scanning of people, and for a smaller site, we generally assume that they would invest in that equipment or just mass training, when they just don't have that many people. Plus as far as United Nuclear, we don't have a lot of detail, but we do know it was Mallinckrodt.

It grew out of Mallinckrodt, and I don't believe we have any information that they had any photofluorographic, and in all odds, they probably would have sent people from the Hematite plant down there if they invested that much money into photofluorographic.

So the default right now is what you said, the standard PA chest X-ray, and unless we find out something different.

DR. MAURO: I think that in some capacity, having that written down as policy, this is it.

MR. ALLEN: I agree.

MR. THURBER: You know, this has

been the issue on a number of sites, that the language in the OTIB is fuzzy as to whether one should assume or what one should assume for non-DOE sites.

It's just unstated. It says for DOE sites, you ought to assume photofluorography in the absence of anything else. It's kind of silent on the other, and that's one of the reasons this issue keeps coming up.

MR. ALLEN: Yes, and we know that and I think there is a revision of TBD, TIB-6 in the works, but I'm not -- it never seems to get to be a top priority.

DR. NETON: I thought we had that already documented, but we'll take a look.

MR. ALLEN: It just doesn't seem to get to the top of the priority list on that particular one.

DR. MAURO: Yes. You know, I go in, I do my reviews, I pull out my -- I get my box. I go pull out my TBD 6, I read it, and

that may not be the latest version. So I'll still saying the same things. But if there's a later version. If there is --

DR. NETON: We'll look. If not, we certainly could clarify that.

CHAIRMAN ANDERSON: It's worth noting, but I think we'll just pass on it probably for now, and see what you have. The other thing would be potentially if you were reconstructing, and you got close, then you might want to go into further effort to see if there might have been fluoroscopies.

MR. KATZ: Bill, were you trying to say something?

DR. NETON: I think Bob was trying to say something.

DR. ANIGSTEIN: This is Bob Anigstein. I have a question about that. I've been working with that in other cases. Is it not plausible that at a small site, it would not have an X-ray unit, and that they would send the workers for their annual

physical to a doctor's office or to a nearby hospital, which might have employed photofluorography?

MR. ALLEN: It is possible, but under EEOICPA, the radiation dose has to be at the facility.

DR. NETON: We have sort of a legal ruling that it has to be -- the exposure has to have been incurred at that facility.

DR. ANIGSTEIN: Even if an examination was required as a requirement of employment, it wouldn't count?

DR. NETON: Yes, yes.

MR. ALLEN: Right.

DR. ANIGSTEIN: Oh, okay.

CHAIRMAN ANDERSON: Well, the assumption is that it was at the site.

MR. ALLEN: The default without --

(Simultaneous speaking.)

CHAIRMAN ANDERSON: So even if they were sent off site, the assumption is that they were de facto assigning that does.

DR. NETON: It's one of those --

MR. KATZ: Sam is shaking his head.

DR. GLOVER: If we know that they went off site, we do not assign it.

MR. KATZ: Right, right. No, no.

CHAIRMAN ANDERSON: Oh, okay.

MR. ALLEN: By default we're saying if we don't know.

MR. PATTERSON: Is there any chance I can get in this conversation?

MR. KATZ: Who's speaking?

MR. PATTERSON: Edward Patterson. I was an employee at United Nuclear.

MR. KATZ: Oh absolutely.

MR. PATTERSON: Okay. There was no X-ray at the site, no equipment. I was an X-ray technician at the hospital before I was an employee at United Nuclear and we never -- all of the X-rays were taken at the hospital.

MR. KATZ: Okay. So what you're saying is that the X-rays shouldn't be

counted, because they're not done on site.

DR. NETON: If that's true, yes.

MR. KATZ: If that's the case. Thank you, Mr. Patterson.

MR. PATTERSON: Okay.

DR. MAURO: As we do in the procedures, we have basically resolved this issue. Do we close it or do we say it's in abeyance until some words are changed --

DR. NETON: Well, we can't close it. The Working Group -

CHAIRMAN ANDERSON: Yes, I mean I would --

DR. MAURO: You're okay?

CHAIRMAN ANDERSON: I'm okay with closing it. Yes, I think that --

MR. KATZ: Bill Field.

MEMBER FIELD: Yes. I think it's fine from what we know.

CHAIRMAN ANDERSON: Yes.

MR. KATZ: Okay. That's an unusual batting average.

CHAIRMAN ANDERSON: Okay. Finding 2 we've got.

DR. MAURO: Now this Finding 2 has to do with external photon and electron dosimetry, and there's bit of a history here, which led up to a point where some data were provided to us. Nicole, are you on the line? Nicole Briggs?

MS. BRIGGS: Yes, I was --

DR. BEHLING: John, I'm also on the line, in case you didn't realize it.

DR. MAURO: Okay, both. I know that you've both been involved in compiling lots of data on film badge data for photon and electron, because that was an issue. There was -- in the process of going through this particular finding, one of the steps along the way was we were asked to look at some data, and then see how it speaks to us.

The issue had to do with selecting the basis for, I guess it was some ratios of -- well maybe it's more than that, photon to

data exposures. In fact, there's a large attachment to the -- I believe so, to the Site Profile or review of the ER, it goes on for many pages, where all that data has been compiled and reviewed.

Do any of you want to tell the story on where we come out regarding that particular issue?

DR. BEHLING: Well, let me talk about briefly the history. In the initial Rev 0, the assigned values were -- the data was contained in the 1960 AEC compliance inspection report, and that probably represents 1959 data.

It was to be used for the entire 11-year period. That was really the basis of the original finding, in the sense where you were talking about a single AEC summary report, which really did not talk about primary dosimetry data. That was probably a reflection of the year 1959, and that was to be used for the full 11 years.

As a result of that finding, I believe the Rev 1 of Appendix B changed that, and they identified data that was in essence data that they were able to uncover for the period of 1958. They extended the period to 1973, and that apparently was now the basis for the revised data that is to be used under Rev 1 for the assignment of beta doses, as well as the penetrating doses.

And so as far as I'm concerned, they resolved some of the issue, but I personally did not look at one of the things that was identified in the last Work Group meeting, as for SC&A to review that data that had been uncovered, that represents 58 to 73.

Now I don't know if Nicole was able to look at that data. I personally did not. In fact, I wasn't aware that NIOSH had provided us with that data.

MS. BRIGGS: Yes. Actually, I did go into the data. All the data wasn't provided in the report, either in the TBD or

the Evaluation Report. But they did have all of the references, and I tracked down all the references.

For the most part, there was one sort of external exposure report for each year, that listed film badge data by worker, and I guess the --

What it comes down to is we were able to put together a big table, and we've got -- and I think it's Attachment B and C of our report, where we've got each individual that was in the data, their employment, whether or not they had film badge data, their position and where they worked.

I guess I'll try -- what it really boils down to is, our findings for that is a lot of the data -- well actually each, for whatever reason each year, the data was presented in different ways. So each year sort of had to be addressed on their own.

But for many of the years, the data is given as a cumulative, as a beta-gamma

together, and NIOSH used beta-gamma ratios in order to break out the gamma exposure. One of our findings, there's sort of two steps involved in that. One is it wasn't clear if the -- in order to develop those ratios, if the values that were below the LOD divided by two, if they were used as part of the ratio, in order to develop those ratios. So that wasn't particularly clear, because those values shouldn't have been included.

The other thing is while we wanted to see a little bit more of an explanation as to how those beta-gamma ratios were developed. For example, we thought it would have been important to include a correlation coefficient, to see exactly how robust the relationship was.

So that's sort of a brief description of the data that we've got here. There's a lot of it. But other than that, there was, you know, there was a lot of data here. The data did seem to be a cross-section

of different types of workers with different types of job titles.

There also seemed to be a pretty good cross section across all of the different work locations, particularly the work locations that seem to be more potential for higher exposure, where enriched uranium was handled. I guess it's the blue room, the green room, the red room and the item room, were identified as areas where enriched uranium was handled.

So other than the issues we have with the beta-gamma ratios, it seems that the data that is used is really is a cross section of -- seemed to be a cross section of all the workers and all the work locations.

CHAIRMAN ANDERSON: So are you saying it can be used to -- it's adequate to build a coworker model, that the ratios are?

MS. BRIGGS: Yes, it seems to be that way.

CHAIRMAN ANDERSON: Okay.

DR. MAURO: The way I read it is the data are there. They seem complete. So perhaps in my parlance it means more of a Site Profile kind of issue, where a little bit more work needs to be done to justify the beta-gamma ratios that were derived when you have to go to those, when you have deficiencies.

But it appears that there certainly is enough data there to build that, and I guess we were having a little trouble with the data documenting how you did it.

I think Nicole, is this one -- I read. There are four reports we're covering here. I read the four over the last couple of days. Is this the one where we have more data than they do, or is this -- am I referring to -- in other words, when we went into the database, did we uncover additional data that was not reported by NIOSH, or am I crossing wires right now?

MS. BRIGGS: I think you might be crossing. This is -- NIOSH did actually

listed each and every exposure report that was listed, and I went and tracked down each one. So it was pretty complete. I didn't find anything that NIOSH didn't use.

DR. MAURO: Now with respect to this issue of beta-gamma ratios, what is it about that that was troubling to you?

MS. BRIGGS: It's just it wasn't, it really wasn't explained. The beta-gamma ratios weren't given and their methods for driving those ratios weren't explained in the report.

That's simply what it is. It's not necessarily that they were wrong, it's just it would have been better if there was a little bit more transparency.

DR. MAURO: Now in doing that, I know there's always this discussion of leading into less thans.

MS. BRIGGS: Right.

DR. MAURO: And you're saying that it's not apparent whether the less thans were

left in or not, in order to come up with the ratios?

MS. BRIGGS: Right, not at all. Like I said, they really are -- there's really no description at all as to how the ratios were described.

MR. ALLEN: As far as the description in there being weak, you know, I'll agree. You know, I basically just said we took an average of these for those years. As far as the less than, the LOD over 2, that's the only thing I disagree with right now at this point.

It is possible to determine a ratio using those or not using those, just using the positive ones. But if you determine using the positive ones, it should only be used on the positive coworkers.

What we did was added in the missed dose that would be associated with those readings, determined the means or the median from both beta and gamma and determine

that ratio, and used it on, in higher data set rather than just the positive readings.

I think it's two ways of doing essentially the same thing, is what it amounts to.

DR. MAURO: I know a lot of folks bring this up, and I have to say it's one of those things I didn't spend too much time thinking about. So let's say I have a population of workers where I have lots of gamma data, and let's say 20, 30, 40 percent of it is below the limits of detection.

Here's your basket of data, and for those same workers, I also have data, and the same situation exists. There's some that's below. So that's my data, which is probably very common. Now I have some workers where I don't have measurements but I want to build a coworker model and relate one to the other.

I guess it's not immediately apparent to me when and why you would not or

you would leave the less thans in, and determining the means, the standard deviation and the 95th percentiles. Doesn't the less than somehow mess up your ability to assign a mean to the distribution, because you've got all these zeroes? They're not part of the distribution. They sort of flattened it out on you.

I know you folks have worked this problem before.

MR. ALLEN: And I mean that's right. They are part of the distribution. They are part of the population of monitored workers, and as you said, that would be used for a population of unmonitored workers, the analysis of this.

If you were leave out the zeroes essentially, you would -- I mean it's hard to explain the math and all.

(Simultaneous speaking.)

DR. MAURO: You've driven the whole distribution off.

MR. ALLEN: Right. I mean you're going to assigning to home monitored workers that, you know, if had a site that stayed 99 percent zeroes, then you're going to end up assigning the monitored workers the highest one percent you've got, and the guys that were actually monitored and got zeroes are going to get less. They're probably unmonitored for a reason.

DR. MAURO: But there are categories of workers where you would say I want to assign to assign a geometric mean. Now very often, when you have lots of zeroes, geometric means zero.

(Simultaneous speaking.)

MR. ALLEN: -- for a missed dose first.

DR. MAURO: Okay. So the zeroes you assign the missed dose and you give it some number, and then -- and that becomes part of the distribution, and then you'll be basically for the population of workers where

you don't have data, you're effectively assuming I'm going to get missed dose, as if they were badged.

Stay with me, as if they were badged but you saw something less than a particular level.

MR. ALLEN: Right. So essentially the mid, the median becomes the sensitivity of the system.

DR. MAURO: And I guess I would argue that that's okay if the population of workers that you have zeroed out, either are unmonitored and you're assigning zero to or missed dose, you have good reason to believe that's probably right for them, you know.

And there's where I guess the case comes in. When that happens, for example, by the nature of the job or whatever limited data you might have for them, to reinforce it, that yes, it's reasonable to do it this way for that group. Now there may be other groups where you are developing a coworker assignment

where maybe you wouldn't do that.

MR. ALLEN: Other sites.

DR. MAURO: Other sites, other job categories. For example, even within a given site there are lots of jobs, these different rooms, for example. Now I'd imagined if there were some workers in the red room or the blue room that don't have any measurements, and you know, you say to yourself well, what do we assign to them, I'm not sure. I'm just saying that this is has always been there, and to this day, I'm not quite sure what the right thing to do is.

MR. ALLEN: Well, I mean each one, any time you do a statistical analysis of a set of data, essentially you've got to realize that it is that set that you're analyzing, and then what you make of that set is the question. That's essentially what you're saying.

DR. MAURO: That's all I'm saying really.

MR. ALLEN: And that's very site-specific. In this particular case, as they're saying on the phone it seems to be a pretty good cross-section of the population, of the external dose here.

DR. MAURO: So in this particular case, I guess the answer to the question is on the right-hand corner. You're recommending that you use the full set of data for coming up with the coworker. Is that where you are on this one?

MR. ALLEN: Are you on the --

DR. MAURO: I'm on Finding 2 on the right-hand side. Finding 2 under the response. So it's Finding 2 of Finding 2.

CHAIRMAN ANDERSON: Finding 2 of Finding 2.

(Simultaneous speaking.)

MR. ALLEN: Finding 2 of Finding 2, it is a little different story, and that is, as I read this, it's essentially questioning what we're doing for 1961 and '65.

DR. MAURO: Yes, again now zeroing in.

MR. ALLEN: 1961-1965 was the time frame where we had the beta and the gamma rating separate. So we developed separate coworker for Dose 2. There is no ratio used. It's the data.

DR. MAURO: Okay, okay. Nicole, do you feel as if you've gotten the information you need to understand where the rationale for the position that's being taken?

MS. BRIGGS: Yes, yes. I'm just trying to follow along with the data too.

DR. MAURO: Okay.

MS. BRIGGS: There's a lot of data to look at, so I'm just trying to --

DR. MAURO: Well I guess, right now my sense is after reading this, I'm not sure that -- I just want to make sure you're comfortable you have what you need.

CHAIRMAN ANDERSON: So for an individual who worked prior to that or after

that, and this period, you would calculate it differently?

MR. ALLEN: Yes, and the Appendix right now has different values for each year.

CHAIRMAN ANDERSON: Yes, okay. That's what I thought.

MR. ALLEN: Yes, based on data, and you have to remember that is for unmonitored workers. The monitored workers were using the actual dosimetry data you have?

DR. MAURO: Yes, yes, yes. Okay. So are we -- I'd like to hear from Nicole. Do you feel this issue's been closed to your satisfaction?

MS. BRIGGS: Yes, I think so. I was just reviewing. I think what ended up happening, I was looking at the matrix and I was looking at our report, and I think there may have been -- I think that there's a little bit of a confusion between the findings and the report, and now it translated into the matrix.

So yes, it really boils down to just that ratio issue, and it's really just, you know, more of an explanation than anything else. There's really no deficiencies in the data.

DR. MAURO: Okay, good.

CHAIRMAN ANDERSON: So do we want to -- I mean is this a document that, for the -- you know, we've talked about it here, but it's not going to be captured in the document. So I mean is it -- is this something that could easily be --

DR. NETON: Well, I think what we're saying is that this is not a SEC issue. I mean so we don't necessarily have to correct it at this exact moment to satisfy an SEC concern.

CHAIRMAN ANDERSON: Okay, okay.

DR. NETON: At least that's my impression of what we're saying.

MR. ALLEN: Yes, SEC deals with that, but we are undergoing a revision to this

Appendix as part of cancelling TBD-6001.

CHAIRMAN ANDERSON: Yes, I gotcha.

MR. ALLEN: And the resolution of it here, essentially the explanation --

(Simultaneous speaking.)

CHAIRMAN ANDERSON: Yes. It's not a difficult thing, but it's the kind of thing that gets slipped through the cracks. A year from now we'll forget.

DR. NETON: No. It will talked about in a Site Profile review.

CHAIRMAN ANDERSON: Yes, okay.

MR. KATZ: So in the new Appendix, that they're revising the Appendix, that explanation will be added.

CHAIRMAN ANDERSON: Better documentation. Okay. That's right. So are we comfortable? I'm comfortable closing it. Bill?

MEMBER GRIFFON: Henry?

CHAIRMAN ANDERSON: Yes.

MEMBER GRIFFON: This is Mark

Griffon.

CHAIRMAN ANDERSON: Oh good, Mark. You have any thoughts?

MEMBER GRIFFON: Yes. I'm trying to -- I know where you are now on the matrix, and the only question I would have before you close it, it's just my -- probably I'm just reading up on United Nuclear.

Did they only do uranium work at, pretty much exclusively uranium, or was there any thorium work that was done there?

DR. BEHLING: There was thorium there.

MEMBER GRIFFON: There was some thorium work done there?

DR. BEHLING: Yes, it was.

MR. THURBER: For a brief time they did some thorium work.

DR. BEHLING: In fact, that's discussed in the next finding.

MEMBER GRIFFON: Okay.

DR. BEHLING: Okay.

MEMBER GRIFFON: I think I'm done trying to catch up, but I think I am still comfortable with this, and I just was reading the Appendix.

CHAIRMAN ANDERSON: So that we'll close it out with the proviso that --

MR. KATZ: Bill, are you okay too with closing this?

MEMBER FIELD: Yes, I think that's fine.

MR. KATZ: Okay.

DR. MAURO: We'll go on to Finding 3, which I believe is the neutron dosimetry work which was done by Bob Anigstein, and he had a number of technical findings regarding the simulation. This is the one we talked about yesterday Bob, is that right?

DR. ANIGSTEIN: Yes.

DR. MAURO: Do you want to give a brief description of some of the concerns you had with the approach taken.

DR. ANIGSTEIN: Okay. Basically,.

they can be broken down into three categories. The first one is a technical issue that we had. I mean the neutron dose was assigned on the basis of OTIB-24, and we reviewed, SC&A reviewed OTIB-24 in 2005, and we had a number of scientific issues with it.

I won't go over all of them, but what it boils down to is that in some cases, as in the present one, the OTIB overestimates the dose slightly, like we -- the independent calculation that we did for uranium hexafluoride, was that the dose could be 27 -- the OTIB-24 overstated the dose by 27 percent, which was not a major thing.

But I would like to mention incidentally that the same OTIB overstates some doses by 400 percent, and others, understates them by a factor of 16. So it's just not a reliable guide.

Now that aside, the second issue was that the dose is not bounding. The second issue is that the extrapolation from natural

uranium to U-230 to this highly enriched uranium is not done correctly, because the neutron generation is not simply a matter of the total alpha activity of the uranium, but of the energy distribution of these alphas.

And even in OTIB-24, you see that the uranium-234 is much more efficient at generating neutrons than uranium-238, and since in highly enriched uranium almost all the activity is from U-234, on an activity basis, then this assumption is not correct. You could understate, significantly understate the U-230, the neutron generation.

And then finally, we questioned, this again is the second order, this is probably the biggest effect. The second order, again, is smaller effect, is the limitation to 50 kilograms. I believe the numbers were reversed.

The analysis assumes 50 kilograms of -- assumes 50 kilograms of highly enriched uranium, and 100 kilograms of 20 percent

enriched. Now the documentation shows at least there was one case where the site requested a shipment of 100 kilograms of highly enriched, and I believe they only requested 50 kilograms of the 20, 20 percent.

So there again is a potential for understating the dose. It could be as much 100 kilograms, and the analysis of criticality is not applicable here. Assuming that the uranium is in a metal sphere with optimum reflection yes, then the criticality, critical mass is a little over 50 kilograms.

But when the uranium is in the form of uranium hexafluoride in different shapes, the critical mass would be much higher most likely, with the uranium just by the lower density will be more spread out and greater chance of neutrons to escape.

So, we do not accept that the 50 kilograms is a limitation based on criticality, where we can't say that 100 kilograms is possible but we require

criticality analysis to show that. Probably the simplest thing to do is to be to assume the 100 kilograms as a possibility.

Then finally, on flipping the coin, the assumption that the worker, that the organ in question would be one foot away from that source actually will be from the centers, since it's modeled as a point source.

That means it would be one foot away from the center of this 100 kilogram source or 50 kilogram source, if you will. Also, it just does not seem realistic. It's an upper bound, but first of all, we question whether it's a plausible upper bound, and also it would be a reasonable to use this scenario to deny a claim, by saying well, it can't -- if the corrections were made, the technical corrections that I testified which would mostly result in a higher neutron dose.

Then one could say okay, this case seems like a candidate for denial, and let's give him the maximum neutron dose, and with

that, if you still do not meet the criteria for compensability, then you can deny with a clear conscience.

However, in the cases where that's not the case, and a realistic dose assessment is required, we question whether this meets that threshold of plausibility. That's about -- I mean that's it in summary.

CHAIRMAN ANDERSON: This is beyond me, this is not my area.

MR. ALLEN: Well, I agree with the ratios of uranium for enriched, that the U-234 would be more effective at producing neutrons, and that wasn't considered in that analysis there, so that should be slightly higher there.

I haven't done the calculations to verify or anything, but I believe Bob when he says that the doses were started off at 27 percent too high and I think that it would probably cancel out to a decent amount, to where it's a small difference with the two

effects combined.

So then it comes down to just the -- essentially the scenario, of how much you can be, you can have in one place and how close you are to it, and we agree. We tried to make it a bounding scenario. Bob's opinion is implausibly high. Our opinion is that it's bounding, but it's not unduly high.

It's not a high enough dose that would warrant compensation for, you know, everybody. So it's essentially, is not unduly high in that manner.

DR. NETON: This is not inconsistent with exposure scenarios we have used for other non-neutron exposures, exposures to drumming operations, that sort of thing.

DR. MAURO: We're in an area where we -- it's not a difficult area, but it's an area that we encounter time and again. When you have a fairly simple physics problem, persons working with a glove box, there's a

neutron source, and we don't have very much information from the workers exactly what transpired, what the size of the source was or the distance was, how long they spent there.

There's no doubt that people could come up with some reasonable scenario that says we are fairly confident that this scenario would probably bound most workers that might have been in the vicinity of the source. Here's where it's a judgment call.

One could come up with some heuristics, saying listen, based on my judgment, I think this does it. On heuristics, that someone could argue well, maybe that's not that plausible.

It's just a little bit too conservative, and it's something that given that, especially if you use a point source, which is really not realistic, and you combine that with a lot of other assumptions, you're going to come up with a dose that perhaps is too high, implausibly high.

In other words, to use the language in the rule, you know, as a plausible circumstances. Are those circumstances plausible? I don't know if we're gilding the lily, but perhaps they're not.

Now what do you do when you confront something like that? You go talk to the workers and get a better sense of well, what did you do there; how long did you spend; what kinds of things did you work with.

And eventually you come up with well, here's the range of kinds of things that people did, based as best we can tell, and this is what we're going to model, as opposed to let's say selecting a scenario which intuitively seems to be a pretty bounding scenario, notwithstanding the mass issue that Bob brought up, the 100 versus the 50. That's something that you guys could fix. That's no big deal.

So I say to myself just about everything Bob brought up is a Site Profile

issue, for you folks to deliberate on, whether or not you can polish the apple and let's maybe fix some of these things.

The other half is questions of the scenarios that they're using that you decide to model. Do you feel that that meets the test of plausible circumstances regarding time? Is it distance, time to the critical organs, geometry, or perhaps is it too conservative?

And now -- in my world, what you've done is those assumptions represent what I consider to be bounding, once the other problems are fixed; bounding with regard to the energy distributions and the mass. And certainly one could say yes, it does place an upper bound.

The only question is, is it a plausible upper bound, and I mean this is really -- now this word "plausibility" is our plague, you know, what's plausible, and that's very much a judgment call. One could argue, I

think Bob would argue that well, you know, it's not necessarily plausible. He doesn't know.

I mean we talked about this yesterday. I don't know if this is plausible. What do you do within that circumstance? You go talk to the workers, and I guess that's where we -- that's where Bob and I walked away from it, and we said okay, we both agree.

DR. NETON: What I'm hearing you say though is that you think the dose is implausibly high. That's what you're saying?

DR. MAURO: No, I'm saying it could be. We don't know.

DR. NETON: Right, but you don't know.

DR. MAURO: We don't know.

DR. NETON: I'm not sure. This is a tricky -- I mean this is not -- by virtue of the physics, it's a plausible dose. What you're talking about is a worker --

DR. MAURO: Circumstance.

DR. NETON: Circumstance relationship, which I think is pretty squishy, and where we would always land on the side of being more conservative I'm not. So you interview workers, "Were you ever a foot from the source?" Maybe, maybe not.

DR. MAURO: For four hours a day, a new organ of concern, you know, his kidney, his heart.

MR. KATZ: I don't think you need to go to those kind of extremes at all.

CHAIRMAN ANDERSON: But that's a thought. Mark, do you have any, or Bill, do you have any thoughts on this?

MEMBER FIELD: I guess it's just based on whichever's, you know, various situations. So it's kind of hard to tell if there's any here.

CHAIRMAN ANDERSON: Yes.

DR. MAURO: You're using a convenient shortcut.

DR. NETON: To me that is almost

like a Site Profile issue. You're really trying to find the circumstances surrounding -- it is plausible to have neutron exposures. We think we can agree as to what the sources were. Now it's a matter of where the worker was positioned in relation to the source.

DR. MAURO: Well, also I believe it was a point source.

DR. NETON: Well, okay.

DR. MAURO: So no attenuation. So --

DR. NETON: Well, that can be modeled.

DR. MAURO: Oh yes, that's a Site Profile.

DR. NETON: All you want to talk about is the distance, the time and distance of the worker from --

DR. MAURO: From the source, to the organ of concern.

DR. NETON: I believe that is something that would not prevent dose

reconstruction. In fact, if you don't know, you would assume something very conservative, which is what we've done in a number of instances.

I think there's sort of a precedent set for this for a number of cases. This is the first time this has ever come up in relation to a model, to model a situation like this. I would argue that it's a reasonable approach to bound the dose.

DR. MAURO: I guess the question I would have is when you come to these boundaries -- let's say first of all, given that whatever modeling assumptions regarding the size of the pit or whatever the source is -- I'm not sure it was the pit, but whatever it is, is you go with a realistic, as opposed to a point, because the point, of course, is going to give you, for the same quantity, you're not going to have self-attenuation.

So that's going to be an overestimate if you go with the point. The

distance is an overestimate. Maybe the neutron spectrum, I think Bob pointed out, may not be an overestimate. The time period that you're going to assume the person's there is an overestimate. So you've got these --

DR. NETON: We don't know that. I mean I think, it's a reasonable estimate. I think this is sort of the same situation that we assume 2,000 hours exposure at the highest MAC measured in a plant for the entire year. I don't know why that's any different here, and no one has suggested that's an implausibly high value.

It's a conservative, bounding value that we've applied, that is based on the physics of a situation or the exposure limits that have been measured.

DR. MAURO: And in your mind, those are plausible circumstances --

DR. NETON: Yes, otherwise we wouldn't have used them. The implausible takes you in a value where you've sort of

violated some basic --

DR. MAURO: Yes, one too far.

DR. NETON: Could the person have been laying on top of the source or I don't know. I guess something, something very out of the ordinary.

DR. MAURO: Texas City, the original Texas City, where you know, that's what happened.

DR. NETON: Yes.

DR. MAURO: Yes. I have to say, my inclination is to agree with you. I know Bob, I know that, you know, you have some thoughts about this too. I don't want to take the wind out of your sails. Do you feel that these are circumstances that could be plausible or we don't know?

DR. ANIGSTEIN: Again, I'm agnostic on this. I don't know. It sounds -- I think it needs to have some factual information behind it, and since there are surviving workers, and we have one on the

line, I would think that some in-depth interviews could help refine the procedures, could help refine what was there.

I know my own experience over the past several years with GSI, General Steel Industries was we got a ton of information from them. There was a group of workers who were very willing to cooperate.

We got a ton of information, where we could practically write a book about just what really happened there, and even though there were some minor differences owing to different accounts. But I don't see that that has been done for UNC.

DR. MAURO: Would you agree this is a Site Profile issue?

DR. ANIGSTEIN: Well, I don't think it's my place. I'm not even sure if it's SC&A's place to decide, you know, to recommend a SEC. That's up to the Board. I guess in principle, if we came up with a new Appendix B and had, based on some realistic

assumptions, which SC&A would presumably then review.

I could see that this could be resolved, let's put it this way. I can certainly see that, NIOSH could, may be able to resolve this issue, if that answers the question. But if in fact will it be resolved is another, is something else.

MR. KATZ: Can I just ask a clarifying -- I mean do we not know what this basic handling process was at this? Do we know nothing about what they did at this plant?

MR. ALLEN: They were making commercial fuel, and get the basic idea. I mean most of it, I believe, was glove box or you know, close-in work that, you know, somebody would be at arms length with, you know, smaller quantities.

But the 100 kilograms was essentially a quarterly order for the enriched uranium. But there was other things they did.

We don't know for sure; we did some scrap recovery, which is what they did for AEC.

We got the general idea of how all that's done, we don't have the details on how all that's done or what their work assignments were with somebody chained to a table, you know, eight hours a day or did they switch out jobs type of thing. So the four hours at a foot seems like a bounding estimate that we could --

CHAIRMAN ANDERSON: It seems to be a little thin, you know, the general information --

MR. ALLEN: Well, the detailed information, yes.

CHAIRMAN ANDERSON: That is there by detail is ---

MR. ALLEN: You're talking work assignments and everything else then. So I mean what we normally get in these meetings is how do you know somebody wasn't there four hours a day, rather than the opposite of what

we're getting right now.

DR. MAURO: In NIOSH's defense, I know that we've worked on other sites where they were dealing with rods and billets, and without very much discussion they said well, we're going to assume they were four hours a day, three hours a day at the rod, three hours a day at the billet, one foot away and I guess another hour or two in the lunch room, and on that basis calculated the exposure, and we had no problem with that. It seemed to be, well that's the guy's job. So he's going to be there.

So I have to agree that, you know, what we're doing here is a little bit different than what we've done before, in terms of the threshold of acceptability. At the same time, given a little bit more richness to the story, that is yes, we spoke to workers; we started to get a little better understanding of what they did, what was their daily routine like and how variable it might

have been, you know.

If that could be done, it raises the, I guess the credibility of the scenario. Yes, the scenario certainly was one that could be plausible.

CHAIRMAN ANDERSON: I don't see a worker interview stuff, but I'm not very good yet at tracking stuff down and then -- so do we have, has that, you know, has that been tried? Maybe we have one worker --

MR. ALLEN: I could not tell you for sure on this one where we stand. I think there was some that weren't enlightening on details of the operation, but I could be wrong.

MEMBER GRIFFON: This is Mark again. Dave, do you know -- the only question I would have is, you know, I agree with John's statement that we've sort of done this approach before, but for this, the question I would have is this enriched material.

Was there a limited number of

persons or was it more of a special operation, or was it throughout the general operation all the time? Did everybody sort of have equal potential to be working with the enriched or the natural material, or you just don't have enough information? Is that the --

MR. ALLEN: Well, they were making commercial fuel and my --

MEMBER GRIFFON: But then they have -- yes, they have the 93 percent enriched some time too.

MR. ALLEN: Right and --

MR. PATTERSON: They had 97 percent.

MEMBER GRIFFON: Oh, they did go -- okay. I didn't see that.

MR. ALLEN: Yes, and Mark, I mean to answer your question, no, I don't have a good idea of whether that was scattered about the plant or whatever it is. I think they had more than one customer and they did different things with different customers.

MR. THURBER: Didn't they make fuel for the Navy?

MR. ALLEN: That was one of their customers.

MR. THURBER: And that certainly would have been the highly enriched, and knowing how the Navy does things, I would presume that that's done in a special area that would be --

MEMBER GRIFFON: Blind, yes.

MR. THURBER: Physically divorced from the commercial fuel, which is only, you know, UO_2 is only two or three percent enriched. I would think there would be a significant physical separation.

DR. NETON: But I don't think we're going to be able to ferret out who worked where on what projects. That's typically not possible. In fact, when you grant an SEC, you grant for all workers on top of that --

(Simultaneous speaking.)

DR. ANIGSTEIN: This is Bob Anigstein. I was suggesting that we find out, you know, identify specific workers. I mean that would certainly add another degree of reality to it.

But to at least figure out, you know, the maximum exposed worker, is that plausible, and then if you can't distinguish among the workers, then you give them the dose of the maximum worker.

DR. NETON: What I'm hearing is, you know, you're suggesting we go back and try to lower these doses. I mean --

DR. ANIGSTEIN: Well, no. Just that we try to find a basis, a realistic basis for it. That's all.

MR. ALLEN: Part of the issue is, and I wasn't saying it, but as Bill said, some of this was for the Navy, and they seem to be somewhat tight-lipped on the process of making Navy fuels. It's not something they really want to discuss with us and or that we can

discuss in an Appendix, if we can get the information.

DR. NETON: Well, I don't know. I think we can commit to maybe trying to go back and talk to some workers. We're not going to resolve it, but I mean there's options you can't share. We feel it's bounding. I'm hearing SC&A saying they'd like to see a little bit of investigation. If the investigation --

MEMBER GRIFFON: I think Jim, I don't -- I'm going to say, I mean I think it's -- I think it is bounded. I think if you add a little more information into it, it can add to the description or the basis for the plausibility argument, you know.

Then I think it is, and here's a word I don't think I've ever used this word, John, except to make fun of you.

DR. NETON: It's a tractable issue.

MEMBER GRIFFON: A tractable

issue.

CHAIRMAN ANDERSON: Tractable issue, yes.

DR. NETON: And see, that was what my point, original point was going to be, is that I don't know if this is really an SEC issue. We've got the physics down. We know the source term. Then it's a matter of doing as best job as we can of documenting the exposure circumstance.

MEMBER GRIFFON: I would agree with that.

CHAIRMAN ANDERSON: So what do we want to do with this finding?

DR. BEHLING: Can I weigh in here on this one, because I was originally the person who made the finding. Obviously, Bob Anigstein refined his assessment. But again, going back to everyone's comment, I too agree with Mark Griffon here. I think you're never going to find the real answers, and I believe that the model that NIOSH used is reasonable.

I think we're never going to have a definitive understanding of the issues, even if we do identify specific workers who may have had exposures. But in the end, it's just anecdotal recall of what they may have been doing, and in the end, we're probably not going to do anything more than what we've already done.

I believe the bounding values, as we've done so many times in the past, are oftentimes estimates, reasonable estimates that are conservative. I think this is resolved in my mind.

CHAIRMAN ANDERSON: It's not an impossible estimate. I mean --

MR. ALLEN: It's physically possible.

CHAIRMAN ANDERSON: Yes, it's physically possible. So you know, I think it is a bounding. So Board Members on the phone, what are your thoughts with this one? Bill.

MEMBER FIELD: Well, I guess I

kind of agree somewhat with what Mark said. It seems like some more information on some of the workers would really address the issue of plausibility.

It sure looks bounded, but I guess support for that, it would kind of be nice to have a little bit of support by worker interview, that this is surely plausible and represents, in fact, worst case.

MR. ALLEN: We can make an attempt, if that's what you want, to try to get these details from workers, et cetera, the high end risk. Like I said, I think we are going to be unsuccessful. The more moderate, 20 percent enriched or something, there is -- we might be able to find, get some details from workers on that.

DR. NETON: I've got to ask the question. If we can't find any additional information, where does that lead us? Is it this issue that it's an implausibly high value, or is it just, you know, we're stuck

with what we have, which is a reasonable, a physically possible upper estimate of the dose?

CHAIRMAN ANDERSON: I mean my sense is that the intent is can we come up with a little bit more justification for it. If we can, that would strengthen the case when we go.

MR. ALLEN: We can say we can attempt. Whether we're successful or not, I have no clue.

CHAIRMAN ANDERSON: Yes. I don't want to drag the thing on for something that really is just augmentation of --

MR. ALLEN: This is for the purpose of revising the estimate, not as Jim said, not tractable or as Mark said, it's a tractable issue. It's just a question of what the number's going to be.

CHAIRMAN ANDERSON: Yes. I mean --

MR. ALLEN: We are in the process

of revising, so we'll see if we can get some interviews and go from there.

DR. NETON: We're going to go back and revise these physics numbers anyways, so we're in there doing that. We're going to reevaluate those physics calculation, while we're in the process of doing that. I don't see that it's a big deal for us to attempt to go back and talk with the workers.

CHAIRMAN ANDERSON: Let's make an attempt at that then, is what I would say.

MR. KATZ: It doesn't sound like you need, even if you were to speak to folks related to the Navy work. I mean you're not asking for detailed process knowledge. You're talking about very general issues of proximity, I mean which I don't think would be held secret, you know, by workers, that sort of thing.

MR. ALLEN: Whether it's actually secret or not, they usually don't tell them exactly what is, what isn't and some of them -

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CHAIRMAN ANDERSON: Yes. They don't want to say anything.

(Simultaneous speaking.)

DR. NETON: Part of me is almost hoping that the actual film badge data itself might be somewhat informative.

CHAIRMAN ANDERSON: Yes, if you have some --

DR. NETON: Really high film badge data, the only way you can get that high is to be in fairly close proximity to these sources.

CHAIRMAN ANDERSON: Well, let's ponder on that a bit, but let's not ponder it too long. If you're going to redo the physics numbers and come back and say that all looks good, that I think would bring it --

MR. ALLEN: There are several things to do. We'll see, you know, it's a different group that will do some interviews or track some people down, and if they come up with something, they'll use it.

If they don't we'll -- they should. We should know whether we're going to have any success or not before we get to the point of needing those numbers in the revision. So it should not slow anything down.

CHAIRMAN ANDERSON: Well that is really my point. I don't want to drag on this any longer than we have to.

MR. ALLEN: You and me both.

CHAIRMAN ANDERSON: Okay. So we've kind of got activities we're going to do on Finding 3. Hopefully, we can do that before we would have our --

MR. KATZ: Next meeting.

CHAIRMAN ANDERSON: Which is in two weeks. I'm kidding you. No, but you know, we do want to not -- okay. Let's go on to Finding 4.

DR. MAURO: I'll try to capture that. I went over it, and Rich Leggett is the author of this. In fact, he wasn't able to

join us. But I just called him and he said "Listen, if you think you might need me, give me a call," and he's going to call in. But nevertheless I know enough about it.

I could sort of get it rolling, and then hopefully he'll sort of come in and maybe enrich the discussion.

What we have here is -- the way I look at it is there are two issues or three issues, three issues. First of all is that you're dealing with the concerns about inhalation of airborne uranium while they were doing what they do with this fuel, and there's a lot of -- apparently, there was a considerable amount of air sampling data, and there was a considerable amount of bioassay samples for some time period, I guess in the early 60's.

And then in '62, for some reason, around that time period, it dropped substantially, the amount of bioassay samples and the air samples, and there's a lot of

discussion in our report of what happened. I think in a nutshell it was looking to save some money, you know, and trying to back off from that.

So they cut back. So we actually have this hole in the data for occupational internal exposure, and then eventually the AEC came in, it was inspection and said "Hold the presses, Jack. We're seeing, we came in for an inspection and we're seeing bioassay samples, urine samples that are above the allowable limits for occupational exposure."

Which sort of belie the limited air sampling data, which said you're probably okay. So this is like one of the times when they said well, if you depend on air sampling data to let you know whether or not everything is okay, you might have a problem, because sometimes there's not a good correlation between the two.

So as a result, UNC went back in and reinstituted a more aggressive bioassay

sample program. So one of our, and now the concern that comes up is okay, so now you have yes, if you've got lots of bioassay data you can reconstruct the doses to the workers. You could build coworker models from that.

But there's this time period. I think there were a couple of time periods where the bioassay data was sparse, and there are some air sampling data. In our report, Rich -- Rich, are you on the line?

MR. LEGGETT: I'm here.

DR. MAURO: Very good. You stop me when I go off track, okay.

CHAIRMAN ANDERSON: Welcome.

DR. MAURO: Rich explained that well, one of the -- okay. If you're going to resort to air sampling data, he showed some graphs in here that say you know, there's a very poor correlation between air sampling data and bioassay data.

So on those occasions when you do have both, they said well, how good is that

air sampling data as a way to predict bioassay, which is a true measure of intake? He showed that it's pretty poor.

So when I walk away, my, you know, my 30-second sound bite on this issue is you know you really -- you've got a problem. There are time periods when you are lacking adequate bioassay data.

All you've got is some limited air sampling data, and we're questioning whether or not you really can reconstruct the doses to those workers at that time period using air sampling data, because of the lack of correlation.

This is further confounded by the fact that the workers, as represented in the Site Profile or the ER, the workers are represented as working with Type M and Type S uranium, which is something that it doesn't change very readily over time.

So if you're doing a bioassay sample, you know, you don't really have to

take a sample every month or every week, you know. It's pretty robust. But if you're dealing with Type F, you've got a problem, because you can have a real high spike of an intake of Type F.

And if you don't take a urine sample in the relatively short period of time after that occurs, it's gone. The time integrated dose over that period where it clears to the bone, I believe, is a limiting factor, could be pretty important.

That's the depth of my understanding of the fundamental issue we have with the internal dosimetry program and the methods being used. Rich, please correct or expand upon anything I may have just said.

MR. LEGGETT: You're doing very well.

DR. MAURO: Okay. Well, if that's it, that's our story, and we're not quite sure whether or not how NIOSH plans to deal with those time periods where there is a paucity of

bioassay data and air sampling data, and also the fact that it's more than just S and M.

It's also F, and how we're going to deal with that, in light of the fact that you have certain limitations in the bioassay and air sampling data.

MR. LEGGETT: John, I would like to add, to emphasize that by far the weakest, the thorn in their whole program was started when they decided to end the bioassay program, starting in early 1961, and for some reason they decided to reduce the sampling program at the same time.

I guess, you know, I guess saving bucks was the key, but we don't know for sure. But it's really just a black box in that period, and it was -- their letters from UNC management suggest that they rediscovered -- they discovered that they had a problem in late 1962, but it was in fact the AEC who had come in and done an inspection and said you have a problem, and you need to restart your

bioassay program and increase your air sampling program.

And when they did, they discovered that they had some workers in the red room, where they were working with highly enriched uranium, they had urinary excretion rates above a thousand dpm per day. So they had a real problem there.

And you would think this, in the highly enriched room, they would have a more intense air sampling program than anywhere else. So that suggests they may have had a general problem.

DR. MAURO: I also noticed that --

CHAIRMAN ANDERSON: So that's the SEC period, right, '61 to '65 wasn't that?

MR. ALLEN: I don't know. I'd have to look. That's the period they stopped doing the bioassay.

CHAIRMAN ANDERSON: Yes, yes.

DR. MAURO: But it's a covered period?

MR. ALLEN: Yes. That covered period goes well beyond that, on all sides.

DR. NETON: '58 to '69.

CHAIRMAN ANDERSON: '58 to '69.

MR. LEGGETT: I'll add one more point here, that even before that, like in 1958, their air sampling program was really sparse. They described it as they would do complete sampling in the plant at least twice a year, and they would do some sampling somewhere at least one week out of every month, and that's pretty sparse too.

DR. MAURO: Was the bioassay sampling at that time also weak?

MR. LEGGETT: Well, it was a systematic program, where they did either -- a worker either twice a year or four times a year, depending on his job, and that's enough to give you a general idea of the conditions in the plant, perhaps.

But if you find a worker who's had elevated exposure, and you've got only two

measurements a year, four measurements a year, you're going to have a hard time using that to reconstruct his dose.

MR. ALLEN: Well, I think that's where we disagree. Uranium, I mean especially where you're talking bone surface, et cetera, the integrated urinalysis over time is directly proportionate to bone and every other systemic organ.

The question is lung dose that you're talking about, which is the -- you can miss a super-high Type F intake if it was -- if you routinely got an acute intake the day before urinalysis, the day after a urinalysis samples, so that you have a long time for it to clear before your next sampling. You can miss a bunch.

Like I said, for systemic organs, the urinalysis is good. Three months is at various cuts an acceptable time frame for the systemic. For the lung, Type F, you just don't get any dose. It has about a ten minute

half-life in the lung, absorption half-life for Type F. It's very fast. So we don't think quarterly is sparse.

DR. MAURO: So quarterly is good for S and M, but maybe not good enough for F?

MR. ALLEN: It is good enough for F, because the only thing getting any dose is the systemic organs, and --

MR. LEGGETT: Well, if you're not worried about dose to systemic organ, then that's true. But I assume you are at some point worried about systemic organs.

MR. ALLEN: No. I'm saying it is good for systemic organs. The biokinetic model in the system is the same for S, M and F. That's purely a lung absorption rate.

MR. LEGGETT: Well now if you've got -- if your measurement, if you have somebody who's being measured twice a year, and you routinely and you come up with three becquerels per day in his urine, and he got a Type F you don't know when, then it could be a

huge dose to his bone surface, or it could be a very small dose.

MR. ALLEN: Only if you assume that it is an acute intake the day after the last urinalysis, and you have to basically keep assuming that where you get into implausible, you know. That's where you're really getting into implausible scenarios, where a guy has to continuously get a big intake on a particular day every time.

It's just as likely he got it, a big intake the day before the sample, in which case your sensitivity is very good. The standard approach when you don't have incident reports, you don't know of anything that's unusual like that is to assume a chronic exposure.

DR. MAURO: Okay. We've been through this before. You're refreshing my memory. So what we're really saying is Type F is a challenge from the point of view of if it's spikes, depending on when the urine

sample is relative to when the spike occurred, it gives you a little bit of grief.

But if the spike occurs, would the argument be that there are records that say well, we know some kind of transient occurred. Would this fella experience such a spike and therefore follow-up investigations would have been done.

If it's chronic, does it really matter? You pick them up during the routine sample, and because there's no evidence that there was a spike and you are picking up, and you believe he's being exposed to F, you just simply assume that he's chronically being exposed to F all along.

That would result in that picocurie per liter in the urine and into the calculation, and this is the protocol that you would adopt. Is that in fact the protocol that's adopted?

MR. ALLEN: Yes, it is, and then the one issue we have, as has been pointed out

in 1961-1962, where they stopped doing the routine sampling, as was I think it was already pointed out, had a few samples towards the end of that that showed very high, more than they were expecting, and that created a whole investigation and restart of the urinalysis program.

DR. MAURO: Right, that triggered that.

MR. ALLEN: What we did was essentially assume the chronic, based on those analyses, those high ones, come up with an intake rate and gave them that or all the time frame up to that point, and it does seem to overestimate the earlier bioassay. So we think it is a bounding estimate at that point.

If there was something more going on, it should show up in those high samples when they did restart the program.

DR. MAURO: And you had tried it for S, M and F at that point?

MR. ALLEN: Yes, and in all

reality, when you do, do it from urinalysis, that's the one that's going to give you the higher dose. For the systemic organs it's going to be close, but S generally gives you the higher one.

And as far as the air sampling that you were mentioning, the Appendix didn't do any uranium intakes by air samples.

DR. MAURO: So even those years that there was this window of two years, lacking bioassay data, at the end of that window, when AEC came in and said uh-oh, you've got a load here.

You've got to get that program back online again, you're saying that you could recover from that, because the big readings you'll get, I would say two years later, can be used to reconstruct the intakes that occurred for those two or three years before.

I'm just trying to think. Conceptually the way you do that is you see

the high numbers, and you ask yourself what would the chronic intake have been over that time period, to give you a continuous, and you step in at the end, and there it is. If you stepped in earlier, that's what you'd see too.

MR. ALLEN: Right.

DR. MAURO: Is there any concern that if you did step in early it could have been ten times higher, or that cannot happen for S and M?

MR. ALLEN: There's no indication they had a program for those two years, so there was nothing that would have caused them to reduce the airborne levels.

DR. MAURO: Well no. We know they reduced the airborne --

MR. ALLEN: Is because they started finding high urinalysis.

DR. MAURO: Well, the NRC stepped in and found it.

MR. ALLEN: Yes.

DR. MAURO: So at some time in '61

or '60, UNC decides --

CHAIRMAN ANDERSON: Do we have those, when they came in and did their --

DR. MAURO: Yes.

CHAIRMAN ANDERSON: We have those results?

DR. MAURO: Yes.

CHAIRMAN ANDERSON: Okay.

DR. MAURO: The reality is, the history is it's the AEC in its inspection role.

CHAIRMAN ANDERSON: But we have the inspections, they came in and they did biomonitoring.

DR. MAURO: Yes, and found the problem, and we have that. They handled it. So it's written up in the report.

MR. ALLEN: Yes, yes, okay.

DR. MAURO: Rich Leggett did a nice job, and that -- you know, so they were forced back in to all right, we'd better get the program up and running again, right.

What I'm hearing is even though they were deficient for a few years in the amount of bioassays that should have been taken, I think there's general agreement that -- even the management agrees no, we should not have cut back on the program.

You're saying that notwithstanding that, when did data start to come in again later on in '63 or whenever, '64, whenever it started up again.

MR. ALLEN: Late '62.

DR. MAURO: '62. You're in a position where you feel confident you could place plausible upper bounds on the intake of uranium for that window of time that you don't have, and the basis for that, and I would agree, is if you have a combination of two things.

One, good records of incidents and transients, where people might have experienced acute exposures over short periods of time, and knowing that they didn't occur,

and if they did occur, there were follow-ups for those particular circumstances.

You know, so you've got that, and you could make a case that we didn't experience this unusual circumstances. Then all you really have is a chronic, ongoing program with people being exposed, and when you pick it up at the end of that program, you just pick it up and you really didn't miss anything.

I'd have to agree. That model of those years seems to convince me that you've got a tractable problem. Rich, did I do a disservice in my generalization of that?

MR. LEGGETT: Well, I don't think that's a realistic situation for plants. I think if that were the case, we could change all the bioassay programs in the uranium plants in the world and save a lot of money.

There's a reason that they do bioassay every week when they deal with high levels of uranium, and I don't think you can

skip a couple of years and assume everything was continuous or assume that you always knew when there was an incident, when there was a leak, when there was a high exposure.

MR. ALLEN: Well I mean I've worked at a uranium plant, and I've never heard of a weekly bioassay sample for uranium. I mean I've seen every two months or quarterly in order to detect your 100 millirem committed effective dose monitoring.

But and a two-year gap is more than that, but we're not talking about having a sensitivity of 100 millirem. We're talking about estimating what the dose was and if it's a rem, it's still a reasonable estimate. But weekly analysis for uranium, I have never heard of.

DR. MAURO: What I'm hearing --

MR. LEGGETT: Well, I've dealt with a lot of them.

DR. MAURO: What I'm hearing is here's the point of disagreement. It's good

to get to a place where it's clean.

DR. NETON: Well, let me -- this is another situation where we've been through this, a number of sites, and this has been our approach.

DR. MAURO: Yes.

DR. NETON: So if now we're hearing that incidents at relevant to all of these situations, this a new finding.

DR. MAURO: I'm not saying it is.

DR. NETON: Well, I'm just saying that's what Rich was saying. I'm saying that this is not something that -- it's something that we hammered out very early on, about use of chronic exposures versus incident-based exposures.

Because like Dave said, the fact is you might have one or two sparsely occurring incidents in there, but it doesn't add to the dose that much. If you have multiple acute incidents, you essentially end up having a chronic exposure scenario.

MR. ALLEN: Yes. It's the old question of how many acutes does it take to make it chronic.

DR. NETON: Exactly.

DR. MAURO: Except if it's F, I guess.

DR. NETON: Well, but the dose through the F from the lung, I mean you're going to bound that with a more insoluble. The dose to the lung from Type F is very small, with higher lung doses, assuming acute exposures to more insoluble material.

DR. MAURO: I agree. I remember three or four years ago, where you've done a number of cases --

DR. NETON: We went through this.

DR. MAURO: And you showed that -- if we assume it's spike-spike-spike, as opposed to chronic. Or but the only place where I think we, there wasn't that, and this is, and you need to correct me if I'm wrong, is let's say the spike occurred right after

the last bioassay sample, and it may have been a year before.

A spike occurs, intake occurs, and it's going to gradually go down. A year later, you pull your sample. Now --

MR. ALLEN: Yes, but even then, you're talking one acute intake versus a long, chronic. You typically end up with more intake on the long chronic, unless you have multiple acutes, and then you're talking has to be multiple times, the day after the sample, and it gets to be very unrealistic. At some point, you have enough --

(Simultaneous speaking.)

CHAIRMAN ANDERSON: Yes, I don't remember. But I do remember there was the back and forth, and I don't think it was really ever resolved. We just moved on.

Let's, just a question here. You have on the next page Finding 6 under the response on the poor correlation with air and biologic samples. Isn't that true of most of

the sites? I mean isn't -- I mean that's just -- I mean that's pecking order. You want biomonitoring.

DR. NETON: And usually --

CHAIRMAN ANDERSON: Yes, go ahead.

DR. NETON: Well, I think that they suggested earlier, that we really didn't rely on the air samples in this analysis.

But oftentimes, most of the poor correlation goes the other way, where the air samples will show a higher exposure than the bioassay samples, because air samples are not particle-size selective. I mean so they pick up everything that's in the air, not just the respirables.

There was an analysis done at Fernald that pretty clearly demonstrated that in uranium. But that's a different issue. We're not using it here.

CHAIRMAN ANDERSON: Yes, so it doesn't apply.

DR. MAURO: It's not relevant.

CHAIRMAN ANDERSON: So that Finding 6 there is interesting, but --

DR. NETON: I guess I'm not sure where to go with it. I personally have not read the analysis that Rich Leggett did in the write-up, and I don't know whether -- do we maybe just want to go back and respond to this --

(Simultaneous speaking.)

DR. NETON: I don't sense that we're going to solve it talking here.

MEMBER GRIFFON: Jim, did I understand correctly that you're not relying on air sampling here?

DR. NETON: That's what Dave's just said.

MR. ALLEN: Not for uranium, no.

DR. NETON: Not for uranium.

MEMBER GRIFFON: You just used it as sort of a check, a reality check kind of thing?

MR. ALLEN: Yes.

MEMBER GRIFFON: Okay.

DR. MAURO: We'll get to it -- thorium is going to be, that's next.

(Simultaneous speaking.)

DR. NETON: You know, I guess I'd feel more comfortable if we went back and looked at that write-up and responded.

DR. MAURO: You know, yes. I agree. If it turns out that the way in which you deal with this class of problems, and we've hashed it out before --

DR. NETON: And if we need to go back and do our analyses again and drag out the old stuff from three or four years ago, we can do that.

DR. MAURO: Maybe that's needed every so often, every two or three years.

DR. NETON: I mean Joyce was involved in the early go-round on this.

MR. KATZ: It was more than three or four years ago.

DR. NETON: You know, Joyce

Lipsztein was involved with this, and this was her exact point early on, and we went through several iterations of discussions on this. I think we ended up where we are.

DR. MAURO: So here we have a site where there's two or three years went by, where there's no bioassay or limited bioassay samples, and the question becomes how are you going to deal with those guys? I mean that's all it really comes out to, are you being fair to them?

DR. NETON: Right, and the question is really, is the chronic exposure model appropriate and does it bound doses for this Class of workers. You get into this situation, though. How many acutes, how many multiple acutes consist of chronic exposure.

MR. KATZ: What was the beginning date where they cut the bioassay program?

DR. MAURO: '61.

MR. KATZ: Okay. So it's less than two years we're talking about total,

right?

MR. ALLEN: I don't know the exact date in '61.

DR. NETON: Did Hematite have Type F material? I mean was it --

MR. ALLEN: They had some UF6, but that's not something you're going to get people acutely exposed to generally, because -- I mean if you release that into the atmosphere in Missouri with the humidity, you're going to produce some hydrofluoric acid.

MR. ALLEN: U02F2 plus hydrofluoric acid.

CHAIRMAN ANDERSON: People will know if that happens.

(Simultaneous speaking.)

DR. MAURO: It's the HF.

DR. NETON: The HF is very irritating.

DR. MAURO: But you see where we are.

DR. NETON: Yes. We'll go back. I mean we have -- I think we need to develop a little more formal position, rather than have a verbal discussion.

CHAIRMAN ANDERSON: Yes. That I think, especially of that, we could just go back the historic seven or whatever years ago, bring it up. We can update everybody on -- if we have all of our copies.

DR. NETON: I mean putting what we just discussed in writing would be helpful, and have some considered discussion.

CHAIRMAN ANDERSON: So any of your other SC&A responses under 5 here you want to talk about?

DR. MAURO: Let's see. Is thorium there?

CHAIRMAN ANDERSON: Yes. It's the last one.

DR. MAURO: It's the -- okay, so it's later on. So let's see if we --

DR. NETON: I'm confused. These

are findings under number five, and now there's an eight listed here. How does this work?

DR. MAURO: I think --

MR. ALLEN: The findings on the left are the original Appendix review, and then there's some new findings with what we call a targeted review.

DR. MAURO: Yes.

DR. NETON: But does this -- okay.

MR. THURBER: The findings on the column on the right are the new findings, based on the September 2010 review?

DR. MAURO: We went through two rounds, when the ER came out.

DR. NETON: But then we go back to Finding 5 on page 13.

DR. MAURO: Right.

DR. NETON: Which is not Finding 5 on page -- oh.

MR. ALLEN: Essentially, we're discussing the findings on the right-hand

side.

DR. MAURO: The right. That's where we are, on the right-hand side.

DR. NETON: I understand. Okay. So Finding 6 on the left-hand column is irrelevant. Well, we've got two Finding 6's now, because Finding 6 stands on page 13. We also have a Finding 6 on page 12 that is different than the Finding 6 that stands on page 13. I mean I'm a little bit confused.

CHAIRMAN ANDERSON: But it's Finding 6 under discussion of your initial Finding 4.

DR. NETON: Well, I understand. But we have two numbering systems here. It doesn't say which column it came out of.

MR. THURBER: Well, but the findings follow the documents.

DR. NETON: Yes, I understand.

MR. THURBER: Now we could have renumbered them and make it conveniently traceable back to the documents. That's the

reason we did it this way.

DR. NETON: I would have called it Finding 4A, B, C, D or something like that. But we have two Finding 6's right now. That's my point.

MR. ALLEN: Yes, we do. We're doing essentially the right-hand side. We're just looking at the right-hand side as the findings of the new targeted review.

DR. NETON: No, because the targeted review has a Finding 6 that stands from the earlier review.

MR. ALLEN: No. The targeted review is the ones on the right.

MR. THURBER: The targeted review is the last column.

DR. NETON: Right.

MR. THURBER: There were other findings that were still open, but the new work that we were asked to do at the last Work Group meeting is covered in the last column. That reflects the new work we were asked to

do. It doesn't mean that there were other things that were not closed.

DR. NETON: But so we have findings, the original findings and the new findings?

MR. THURBER: That's correct, yes.

DR. NETON: But some persist from in the first group. I would suggest that we renumber all these when we're done, and make them one.

MR. ALLEN: I'm following it.

(Laughter.)

CHAIRMAN ANDERSON: Well, if we renumber, since we've been talking, the transcript is going to reflect the numbers you're talking about here. So let's not change them until after that.

DR. NETON: We're down to Finding 8 on page 12.

CHAIRMAN ANDERSON: Eight, yes.

DR. MAURO: Thorium, I think and just to start it off, I think that thorium was

reconstructed based on air sampling data, and the assumption that the gross alpha activity that was observed in the air samples at the time of the thorium and the location of the thorium operations I understand was somewhat limited, can be assumed to be thorium exposures, and on that basis, you can reconstruct doses.

At that point, I'd like to turn it over to Rich to add to that, and maybe give it more nuance.

MR. LEGGETT: I couldn't hear you.

DR. MAURO: Oh, I'm sorry. I simply introduced the idea that now we're moving on to thorium, and it's my understanding that the issues we raised related to thorium have to do with that it's all based on air sampling data.

MR. LEGGETT: That's right.

DR. MAURO: And whether or not you can reconstruct thorium-232, I believe it's 232, inhalations, based on the air sampling

data that's available through NIOSH.

MR. LEGGETT: Yes. Well, that's another running battle between us and NIOSH. Joyce Lipsztein and I said "No, you've got to have better than that."

But I think you have to have better data than what they have to reconstruct doses. They don't even -- I don't think the information is available to say exactly what radionuclides were monitored, but I couldn't find it. But maybe it exists.

DR. MAURO: When you say what radionuclides, do you mean that the -- I know that the air samples were gross alpha, and the presumption was that that was thorium that we're looking at. When you're saying perhaps it was uranium also?

MR. LEGGETT: Yes. I don't -- I mean as far as I know, they didn't measure any daughters. You know, we've had this disagreement before. If all they're measuring is gross alpha, which is probably the case,

and if they're actually also measuring some uranium, they're probably okay if it's a large uranium in there. I don't they know that either.

DR. NETON: So why would that not be conservative, though, if it included uranium and daughters from thorium?

MR. LEGGETT: No. I say if it does include uranium, that helps you out. I mean that's -- you're overestimating.

DR. NETON: But even the daughters, if they were in there, it would overestimate the exposure of the thorium. I mean we're assuming the gross alpha is entirely related to thorium-232, and 228 I guess, which is in there.

But I don't understand why that would not be an overestimate in all cases? It's at least representative. If it's only thorium, it's an overestimate if there's uranium and thorium daughters in the air.

MR. LEGGETT: I don't know. I

mean I don't know from that little bit of information where it could be overestimating or underestimating if it's daughters.

DR. NETON: Well, if you're measuring gross alpha and you're attributing every alpha emission to thorium-232 and there's more in there, more alphas than just from thorium-232, it would overestimate the air concentration, would it not?

MR. LEGGETT: I don't know that that's the case.

DR. NETON: Why not? If I measure daughters and include them as thorium, would that not overestimate the amount of thorium in the air?

MR. LEGGETT: I don't know the answer to that.

DR. NETON: Why not? You're counting more alphas than are really there. I don't understand why you can't agree to that, but I mean that's why you wait for --

MR. LEGGETT: I don't know.

There's little information.

DR. NETON: That's why you wait for filters to decay for thoron and radon progeny, so you don't overestimate the amount of long-lived in the air. I mean that's a standard practice in air sampling.

MEMBER GRIFFON: Yes. Jim, I mean I certainly can agree with that. But I would more have the question, can Dave, just to step back for a second, can you just give me an overview of what the air monitoring program consisted of?

Was it general area samples, how many do you have, and you know, just a general, just to step back a second, just because I haven't reviewed all this as -- I'm not as prepared as I should be probably, but just to step back a moment. I don't know what kind of data we're dealing with even.

MR. ALLEN: I can give you just a short one, because honestly I didn't go back and look at it that closely myself. But it

was some 200 air samples, 212 rings a bell, but that's probably wrong.

MEMBER GRIFFON: Over the course of the ten years or so?

MR. ALLEN: No. Over the course of the thorium project. The thorium project was short-lived. I think it was in one particular year or a portion of that year.

They did some 200 samples during that time frame, and it was a thorium-uranium mixed fuel, very much thorium. I think it was like a few percentage points of uranium added. It was a strange mix.

MEMBER GRIFFON: Do you know if it was process samples, general area or -

MR. ALLEN: I believe there were general area, but I don't have it off the top of my head. I can find that out. I'm not sure I can find out while we're talking though. I don't know if I have that reference.

MEMBER GRIFFON: Yes, that's

helpful. I'd just like to know --

DR. NETON: Yes. I think that's a relevant issue here.

MEMBER GRIFFON: Yes.

DR. NETON: I would agree, that that's a topic of discussion, whether or not the gross alpha can be used to bound thorium I think is a non-issue personally.

MEMBER GRIFFON: Yes, your point. Jim, I agree with you on the gross alpha issue.

DR. MAURO: Is the issue related to the poor correlation between air sampling and bioassay data, you know? This undermines the use of air sampling data in general.

Now you had mentioned that and this would be interesting. I didn't know this, that when you use air sampling data to reconstruct internal dose, it tends to overestimate. I thought it was the other way.

DR. NETON: It can, it can. You have to be careful. If you're using only

general area samples, you would probably overestimate. When you have enclosed process-type samples, you know, near the operation, it will overestimate intakes, because again you've got the entire spectrum --

MEMBER GRIFFON: There's a lot of things going on there. I mean I think Jim's point was that if you used gross output, you're assuming more alphas than are really thorium. Therefore, you're overestimating from that standpoint. But the location of the sampler is so much more critical, I think.

DR. NETON: Yes. You've got to look at the sampling. But if you have an air sampling program that is fairly representative of the workplace, it will typically overestimate the intakes because again, you're not particle-size selective. You have a spectrum of particles in there.

MR. LEGGETT: Agreed.

DR. NETON: And then there's a paper on -- Fernald did a paper on this a

while ago, I mean in the 60's, I think, or even late 50's, that compared urinary output versus what was being measured in the air. I'm reasonably certain, I hope I'm not -- on this, but I'm reasonably certain that the air samples, as they took them, overestimated the inputs.

DR. MAURO: There's actually a graph in this report that shows the correlation between air sample and bioassay sample. I wanted to open it up to see if it goes the way you said. In other words --

DR. NETON: Yes. It could go a number of different ways. I'm saying if you have a representative air sampling program, it will overestimate.

DR. MAURO: Yes. If everybody has, I mean because this goes toward the issue. If everybody has the report, the United Nuclear report dated September 30th on the top of the page there, I'm looking at page 24. You are? Maybe Bill will share it. Now

this was important to me. I think it's important in the broadest of senses.

DR. NETON: What page are you on John?

DR. MAURO: I'm on page 24.

MR. THURBER: Figure 1.

DR. MAURO: Figure 1.

DR. NETON: Just give me a chance to bring it up here.

DR. MAURO: Sure. Now is for UNC. This is when they had both data, and it seems that it's a scattergram, whereby the best example, I would imagine, is if you look along the X axis and you see 50 picocuries per cubic meter as the dust loading in the air, the uranium, and you say okay, how does that correspond to concentrations in urine.

Well, in one case it goes to 400. But then in another one, in the same general vicinity, it's 100. Now a factor of four. I've got to tell you, a factor of four doesn't give you too much grief, but it's a factor of

four.

And so you know, things are scattered in a way, and this is in the eye of the beholder, how bad is that, what this -- you know, there really is not a nice trend. You know, you would like to say oh, it's a straight -- the fact that the best fit is a flat line says a lot.

DR. NETON: Yes, and again, it depends on which air samples you're measuring in here or using in this analysis, and where they were.

DR. MAURO: I think they're coupled. I think it's the breathing -- in fact, I remember reading this a few months ago.

DR. NETON: These are breathing zone air samples?

DR. MAURO: Yes. They were taking -- well, I don't know if they're called breathing zone. The samples were taken from a header where the worker was, for the time

while he's working there, and then the urine sample was taken and they're sort of coupled.

I think that that's what their -- please, it's good to read it, though. I don't know. Rich, am I representing this correctly?

MR. THURBER: It says they're time-weighted averages, John.

DR. MAURO: Yes, and they're coupled. The exposure --

DR. NETON: Time-weighted averages. Well, we'd have to look at it. I can't tell from there.

DR. MAURO: In other words, here's the intake estimated for this guy for some time period, and here's the urine sample that's supposed to represent -- that's used. Now the question becomes if you didn't have the urine sample, would you be able to trust? This says maybe not.

DR. NETON: In this particular case, it appears that way.

DR. MAURO: Yes, and there is

where -- so I think this kind of issue, and it goes to the thorium question, was the thorium question. You are using air samples.

DR. NETON: Right, and that's fine. That's, we need to get with those samples and look at them and see what the developed spread and distribution of those were.

DR. MAURO: Yes.

DR. NETON: But I have to go look at the particular data that was analyzed and see what.

MR. ALLEN: Well, in this particular case, you've got -- it does point out something Jim was saying about there is often a lack of correlation, because the air samples tend to go high, and that can happen because of the exposure scenarios where you don't know.

So you're assuming the guy is there, whereas people actually tend to draw an air sample when the work is going on, and not

when it's not, and you've got to expose it at all times. Also, air samples don't inherently take into account the PPE, you know, the respirator where --

DR. NETON: Exactly. That's a big issue, where we had no account of respirator protection at any of these sites.

DR. MAURO: So you don't know.

DR. NETON: And so you don't know which one time the guy was wearing a respirator and which time he wasn't. There's a lot of issues here.

MR. ALLEN: Then you toss an outlier in there and it can screw up any kind of correlation. If you look at Figure 1, if you throw out the one outlier that's at 400 dpm per liter of urine, it almost looks like a straight line going up there, with some low ones to the right that were probably --

DR. NETON: Where there may be PPE?

MR. ALLEN: Respirators. So if

you have to look at that one outlier, and as it is, it's 406 dpm per liter. Two months later, he's got 45 and four months before he's got 44, and routinely he's showing 10 and 20.

It is possible, and it has been a problem in some of these, where a guy can contaminate the sample, you know, not his internals but actually his sample while he's leaving.

DR. NETON: And not just contaminate. You've got chronic exposure scenarios ongoing at the same time. So a spot sample taken during a monitoring campaign could represent an accumulated body burden that he's been excreting from --

There's a lot of issues here that I think point to air sample data is not as bad at predicting as -- based on looking at straight analysis of urine data. You've got to take in a lot of confounding -

DR. MAURO: The air sample is point in time; the urine sample is time-

integrated.

DR. NETON: It's time-integrated, and then you've got PPE usage that's not taken into account.

DR. MAURO: And so here we have a perfect case. We have a guy here where he has the air sample is up there, the 150 to 200 picocuries per cubic meter, but there's nothing in the urine, right. Now what does that mean? It's the highest of all the measures --

DR. NETON: Because he was wearing a respirator.

DR. MAURO: And there's nothing in the urine.

CHAIRMAN ANDERSON: He was off on vacation for two weeks.

DR. NETON: I would expect the higher the concentration, the more likely it is that he's wearing a respirator.

DR. MAURO: Yes, and there you go. so what do you do with that?

DR. NETON: Yes, exactly.

DR. MAURO: Well now that being the case. Okay, let me just play this out, to untangle the knot.

MR. ALLEN: Well in general then, we don't account for PPEs when we're doing air samples, and in general, that ends up being considerably higher than what you would get from urinalysis. This is always an outlier here, an outlier there.

DR. NETON: I think we saw this at Simon, Simon Saw and Steel. The urine data didn't track with the air concentrations that were being measured.

It was much higher in the air than in the urine. So it's really a case-by-case basis. I mean I don't think you can pull one air sample series of measurements off the shelf and compare them and go "Oh, look at this. There's no correlation."

There are a lot of papers that have been published on this, and I think

frankly that you can go both ways, although I would say most of the publications you're going to find out there show these types of uncorrelation.

DR. MAURO: What do we do here? I mean given our thorium story.

DR. NETON: I think it's incumbent upon us to demonstrate that we -- why we believe that the thorium samples that were taken were representative of the workers' exposure.

DR. MAURO: Yes, and can be used.

DR. NETON: And it's going to be an overestimate, because we've included uranium and all the daughter products in the air.

CHAIRMAN ANDERSON: But is it -- you know, I mean it's easy to do an overestimate. The question is, is it a realistic --

DR. NETON: I don't think gross, using gross alpha is an issue personally. I

think that's okay. I think the main issue is, is this air sampling, these 200 or so air samples adequate to document this less than one year process that occurred.

And the fact that many of them were process samples, I would say we've got it. I mean we've seen -- process samples back in this era are usually taken, you know, they're even labeled as not indicative of the exposure of the workers. They're like trying to get a rough idea of an upper level of the magnitude.

CHAIRMAN ANDERSON: So you'll put together a little more documentation on that?

DR. NETON: I personally won't, but someone will.

(Laughter.)

CHAIRMAN ANDERSON: I'm going to parcel out assignments to individuals. No, I'm just saying that I think to move this along, that it's what we need.

DR. NETON: I agree.

MR. ALLEN: We need to show that the air samples are representative of exposures for the thorium project, and I can't put my hands on this thing. I don't have it with me and I can't put my hands on that reference marker, because I don't -- I just can't remember.

I'm thinking they're GAs, but I cannot remember. That will be part of showing whether it's representative or not though.

CHAIRMAN ANDERSON: So we'll get a little report on that.

MR. ALLEN: Yes. We owe you something there.

DR. MAURO: Okay. Finding 5. Old Finding 5 as stands, we've had nothing new on that, right? Yes. I'll tell you, when I was reviewing this, I stopped at the --

(Simultaneous speaking.)

DR. MAURO: I didn't keep going with the residual period. It looks like there's some residual period issues.

DR. BEHLING: Yes, I can elaborate on that, John.

DR. MAURO: Thanks.

DR. BEHLING: What it turns out is that I looked at the protocol for determining what the inhalation dose was for residual contamination, as defined in the Rev 0 and then Rev 1, and there was really no significant difference other than the date on Rev 1.

And on the basis of what the protocol was, the intent was to use the highest intake rate from Table D-1, to convert that to an air concentration that would then settle the floor for a period and accumulate for one year.

Using their protocol, and they used also a resuspension factor of E minus 6 and applying those values, I ended up with an inhalation dose that was 20 times, 29 times higher than the one estimated by NIOSH.

On this, they have something that

I didn't consider or identify, an error in my assumption. I think the finding stood, as we discussed the last time around. So what we have here is a discrepancy that's about a 29-fold discrepancy.

DR. NETON: So what you're saying, Hans, is you think that there is some sort of a calculational error in our --

DR. BEHLING: Well, I can only look at my calculation, Jim, and I can't see any flaw in what I did. If you look back at both the original write-up and then the subsequent review of Rev 1, I basically regurgitated what I stated beforehand, identified my calculations the way I saw or interpreted your model, and I ended up with an inhalation dose that was 20 times higher than the value of 10.34 dpm per day for Type S uranium, as defined in Table D-1.

So unless somebody can point an error out in my calculation, I stand by my initial statement.

DR. NETON: We need to look at that. It sounds like a simple -

DR. MAURO: Yes, yes.

DR. NETON: Unless Dave's got something.

MR. ALLEN: Well, we discussed it last time and I am looking at my notes and can't recall the details. I think we did point out an error in your calcs Hans, but I just don't recall. I'm going to have to end up -- it's a simple thing. I mean if there's a math error, then it needs to be fixed obviously.

DR. MAURO: So a Work Group action item is want the calculation --

MR. KATZ: So do you have Hans' actual calculations?

DR. BEHLING: Yes. Just for information, it's on page eight of my revised write-up that incorporates the revisions to Rev 1, where I by and large went through the same calculation and identified the values

that I thought were appropriate, based on the recommendation for using the data of Table D-1, in terms of the highest intake rate.

I mean it's a very simple calculation, where you end up with an air concentration times a deposition velocity, which I believe was also identified as something, what was it, about 0.075 meters per second or something.

I used all the recommended values that NIOSH uses from deposition velocity to resuspension, and came up with a ground contamination at the end of a full year, and then used the resuspension value of one E minus 6, and I end up with a value, inhalation value per day that is 29 times higher.

DR. MAURO: Hans, when you came up with the buildup on the surface, and then the dust loading from resuspension, did you decay that or using what's constant during the residual period?

DR. BEHLING: Well, there's no

reference to that. As I said, my flow contamination level after one year was based on a surface contamination that reflects the maximum inhalation dose on Table D-1, and then I used a 0.075 meters per second deposition velocity, which is defined in meters per second, and then the number of seconds in a year, and end up with a dpm per square meter of flow contamination, and then applied the simple resuspension factor of E minus 6, and ended up with an inhalation dose that's 29 times higher.

DR. NETON: Is that for a work year or a calendar year deposition?

DR. BEHLING: That was, I believe it was for 2,000 hours.

DR. MAURO: The reason I asked the question is there's history here. Over the course of the least couple of years, we have concurred with you folks on at the beginning of the residual period, you pick a number that's at the end of operations and that

represents sort of like the transition.

This is going to be the start of our residual period. You pick some dust loading, whatever it is, and then you -- and we're okay with that. And then you apply a deposition rate as .00075 meters per second, which is the rate at which the stuff is falling down, and you allow that to fall down for a full -- I don't know, sometimes it's a week and sometimes it's a year. It's a little fuzzy. But anyway, the whole concept.

And at one time we had a problem with that. We don't have a problem with that because David made a very good case that this works. So now you have the activity on the surface of the ground at the beginning of the residual period.

Then you say okay, but now we're going to put -- now from that, you can get external exposure, and also from that you can get inhalation exposure from resuspension.

Now, our position regarding the

resuspension factor has matured a bit. We believe that if that, that residue, it sits there, it hasn't been cleaned up, it's substantial. 10 to the minus 6 is not a good number. We like 10 to the minus 5.

However, if there was a cleanup that took place, similar to what took place at Linde, where they deliberately went in and vacuumed all the stuff up, and now the 10 to the minus 6 is starting to look good, because there's lots of evidence from the NRC reports that when you do clean the stuff up, that your 10 to the minus 6 is probably a good number. And we may not have said this out loud before, but I'm saying now, that when you could show that, that the cleanup did take place, 10 to the minus 6 holds up nicely. It's when there was no cleanup.

Now, to go back to the original question, but that's the beginning. So now let's say you go with your model and you come up with your dust loading at the beginning of

the residual period. Now you can do one of two things. You've gone, you could just assume it's constant. Okay, in this case you assume it's constant.

That's extremely conservative. We are prepared to accept that if you have FUSRAP data 25, 30 years later, that where they measure the air dust loading or measure the surface contamination, as far as we're concerned, you can draw a slope from that 1950 data, whatever it is, down.

Now in this case, Bill's just pointed out that you didn't do that. You left flat. That seems to be pretty bounding.

DR. NETON: I think we're all in agreement with that. It's just that Hans couldn't duplicate what our calculations were.

DR. BEHLING: And let me just briefly, because it's a very short statement that defines the model, and I incorporated it into my finding, the very statement that I used. It appears in both Rev 0 and Rev 1, and

I quote the following.

"In order to estimate residual contamination to the highest intake rate from Table D-1 was converted to an air concentration, to settle on the floor and accumulate for one year. The surface contamination resulting from this was then assumed to expose an individual for 2,000 hours per year."

That's basically the sum total of the model, as I see it described in both Rev 1 and in the original Rev 0, and I simply applied that, using, again, the standard deposition velocity and the resuspension, and agreed even the 1 e minus 6 might be contestable, especially if you don't define the circumstances.

If for instance, as John pointed out, there was a concerted cleanup effort, where the cleanup effort basically removes differentially loose surface contamination, 1 e the minus 6 might be appropriate. In the

absence of a cleanup operation, well perhaps 1 e minus 6 is not conservative, and maybe 1 e minus 4 or 1 e minus 5 might be appropriate.

But in not even contesting that, by simply applying the various parameter values of deposition and resuspension, using the models as described herein that I just quoted, I ended up with an inhalation dose that's 20 times -- 29 times higher than the 10.34 dpm per day that is defined by NIOSH.

So the only thing I'm asking is where is the error or why can't I duplicate the numbers that NIOSH quoted, without necessarily questioning the assumed parameters.

MR. ALLEN: Yes, and from the notes I got, and I don't have your original review with me; I'm trying to find it and I don't have it right here, but my notes indicated that I think last time we admitted there was a math error for both Finding 5 and Finding 6.

DR. BEHLING: Well, we haven't got to Finding 6 and we will discuss it. There was a mathematical deficiency in my calculation. But I don't think that applies here.

MR. ALLEN: Well, I was going to say there was a math error, if I'm not mistaken, on both of those. There was a math error in the Appendix or a typo, one or the other, and I think there was also one with your calculation between the two of them. It's math, and we intend to fix it, you know, during the revision.

DR. MAURO: That makes life easy.

MR. ALLEN: Yes. I mean that's --

CHAIRMAN ANDERSON: Yes, okay.

MR. ALLEN: But it's math. It's not something that needs -- it's not an opinion, you know.

DR. MAURO: Do --

CHAIRMAN ANDERSON: Is that also true then for 6?

MR. ALLEN: That's what my --

CHAIRMAN ANDERSON: -- 5 and 6 on the residual, yes. So both of those are -

MR. ALLEN: That's what my notes say but like I said, I don't have the detailed thing here, and I really didn't look at those old findings when we -- when I was trying to get ready for today. I looked at the new report.

DR. MAURO: In 6 though, we're saying you're too hot. In 5 --

DR. BEHLING: No, in number 6, let me clarify that, too. My estimate of residual external radiation dose was based on Federal Guidance Report 12 for U-234 and 235, and I was obviously in error, and I think NIOSH correctly pointed out that Federal Guidance Report 12 for those two isotopes does not incorporate the short-lived daughters that would be in -- equilibrium with 234 and 235, and they would be a major contributor to both external and -- to external gamma and beta

radiation.

When I went back and recalculated using Federal Guidance Report 12, but now incorporating the short-lived daughters that can be assumed to be in equilibrium with U-235 and 234, my calculation turned out to be within a matter of a few percentage errors, a few percent error of the dose estimates derived by NIOSH. So I stand corrected, and I withdraw that Finding 6.

CHAIRMAN ANDERSON: So we're closing Finding 6.

DR. BEHLING: Yes.

CHAIRMAN ANDERSON: Finding 5 is basically closed, as long as you've fixed the numbers. So we'll sort of keep it open, but --

MR. ALLEN: In abeyance.

CHAIRMAN ANDERSON: Yes. We aren't going to have to discuss it anymore.

DR. MAURO: Do we have any SEC issues here that jump out?

DR. NETON: No, not in 5 and 6.

DR. MAURO: No -- I don't think we talked about it on Hooker -- on United Nuclear.

DR. NETON: I think the air sample justification for thorium is potentially -

DR. MAURO: Okay -

DR. NETON: I don't want to argue that too strongly, but I think that clearly we need to demonstrate that the air samples are --

CHAIRMAN ANDERSON: I was going to say that for here, I would say that's our number one action.

DR. NETON: In my opinion, that's true. I don't want to bias anybody else's, but that's what I think.

DR. MAURO: I feel the same way. It's important, though, that the Work Group feels the same way.

(Simultaneous speaking.)

CHAIRMAN ANDERSON: Any comments

on the phone?

MEMBER FIELD: No. I'm in pretty much agreement. This is Bill.

CHAIRMAN ANDERSON: So do we want to say anything about Observation 1?

MR. KATZ: Jim, do you need a break?

DR. NETON: Well, I think once we're done with the UNC.

CHAIRMAN ANDERSON: Yes. I was hoping to close this.

DR. NETON: I don't know whether, you know -

CHAIRMAN ANDERSON: I mean now that it's --

DR. NETON: Observation 1 basically says that we should have a better description of the characterization of facility.

DR. MAURO: In other words, this is just something for your information. You can use as you see fit.

DR. NETON: I mean I would say that we would take that under consideration when we revise the Appendix, and we'll flesh that out.

CHAIRMAN ANDERSON: And now that we're doing away with the 6001 part, the appendices have got to stand on their own more, so maybe --

DR. NETON: To be fleshed out a little better in the next revision.

CHAIRMAN ANDERSON: So we'll call that closed, too. Any other issues on United Nuclear? On the phone, questions, comments?

(No response.)

CHAIRMAN ANDERSON: Okay. So I think we are going to move forward on getting the thorium -

DR. NETON: Air sample.

CHAIRMAN ANDERSON: -- air sampling.

DR. NETON: And we did agree to provide some written response on the uranium

bioassay -- adequacy of the uranium bioassay measure.

DR. MAURO: No action items for SC&A, or did I miss something?

CHAIRMAN ANDERSON: I don't think so.

MR. KATZ: No action items for SC&A.

MR. ALLEN: And we were going to try to see if we can get a hold of some workers, and find some details on the neutron exposure.

DR. MAURO: Yes, the story, the neutron --

(Simultaneous speaking.)

CHAIRMAN ANDERSON: Okay. So let's take a break then.

MR. KATZ: So should we say 15 minutes?

CHAIRMAN ANDERSON: Yes. So then should we get started, I mean we're going to -- can we do Electro Met?

DR. MAURO: Sure.

DR. NETON: We did agree that we would reconvene at one o'clock.

MR. KATZ: So we want to break at noon, about noon for lunch. But so we'll reconvene at 20 after for Electro Met.

DR. MAURO: Am I safe to assume that I should push my 3:00 flight to a later time? We're not going to finish by 3:00, is that right?

CHAIRMAN ANDERSON: Well, I don't know, I mean you have a better sense -

(Simultaneous speaking.)

DR. NETON: Substantially less time on these next two.

DR. MAURO: I'll take my chances.

CHAIRMAN ANDERSON: You don't have some of your responses.

MR. KATZ: I'm putting the phone on mute but not disconnecting.

(Whereupon, the above-entitled matter went off the record at 11:06 a.m. and

resumed at 11:22 a.m.)

MR. KATZ: So we're reconvening after a break. This is the TBD-6001 Work Group, and we're going to pick up actually -- we thought we were done with United Nuclear, but there's another piece that needs to be addressed before we close that site -- discussions on that site. John, do you want to --

DR. MAURO: Yes, I'll be glad to. One of the things that we overlooked this morning is part of the work we did when we prepared our review of United Nuclear was to review carefully the 97 page SEC petition, and try to capture what the sense of those concerns were. So our report includes a couple of sections.

For those of you who have access to the report, it's on page 10 of 91, called Section 3. What we did here -- what Joseph Provecchio, who's on the line, did, prepared this for us, he said "Listen. I went through

the 97 pages, and I tried to collect the information as best I could." Is someone trying to speak?

(No response.)

DR. MAURO: No. Anyway, so there are basically -- and to make sure we didn't do -- if there are any petitioners on the line, I would very much encourage to feed back if you think that in condensing the 97 pages of material into six fundamental issues, please let us know if we missed anything of importance. I guess that's the first thing.

Then what I want to do is -- and we're not going to go over them right now because we will in a second, then at the end of our report, on page 29 of our report, where we sort of summarize the whole story, you'll see toward the bottom of the page, we reiterate each of those six issues, and we give SC&A's position whether or not we agree that this is a concern that needs to be addressed, or whether or not it has been

addressed adequately already in the ER, okay.

So let's go through them quickly. The first one has to do with transuranics; that is, they're radionuclides other than thorium and uranium, that might have been present in the feedstock that was handled, including recycled uranium.

We looked into -- this is the issue that was raised. The petitioners said listen, you have to look at that. That's important, and we looked into this and we found that yes, there's evidence that there was recycled uranium at the site, and -- because of the presence of technetium-99, and we concur that this is an issue that does need to be looked at, and that's where we stopped. You folks certainly could take a look at it, see if you agree.

The second issue, I'm reading it quickly here, Joe, if you want to jump in and help out a little bit here, please feel free to do so. I'm just reading these concerns. I

don't know if he's there.

(No response.)

DR. MAURO: Well, I'll read it.

MR. PROVECCHIO: This is Joe. I'm on the line. I had it on mute.

DR. MAURO: Okay. Joe, why don't you go ahead and you take it. You did the heavy lifting here. Just read through the concern and I'm on page 30 of the main report that I forwarded to you. Why don't you go ahead and take it from here?

Just read the concern and what SC&A's position is regarding the concern.

MR. PROVECCHIO: Well, the first one you covered already, the fact that the petitioners identified issues related to transuranics, and we confirmed that that's probably correct, and that needs to be addressed.

The other one was taking a look at the protocols and dosimetry data, that it seems that the Site Profile may not be

consistent with the actual occupations and task assignments at the facility, and this is something too that I believe that if we interviewed folks, with specific line of questionings towards this, it may help us make a better Site Profile to be able to reconstruct the doses, particularly in areas of bioassay or in the protective equipment that was used in housekeeping practices.

The next concern was dealing with the types of scans, and the ALARA protocols that were taking place, that may or may not have left personnel leaving the site with contaminated clothing and so forth.

So there was specific comment about the consequences that that may have resulted in, and we think we need to be respectful of the petitioners' concerns and questions and address that as best we can.

The next one listed as Concern No. 4 was the challenges.

DR. NETON: Can we go back? I

don't know if we're going to talk about these at all, but --

DR. MAURO: Okay.

DR. NETON: This one seems to be concerned with contamination of workers' homes, and I'd just like to point out that I think we all understand that those exposures aren't covered under this program.

MR. PROVECCHIO: Well, whether or not they're covered in the program, it's a matter of being respectful of the petitioners coming out and making a statement that needs to be responded to, whether or not this is included in the program or else, or how else it would be addressed I think is something that's worth consideration.

DR. NETON: Yes, I'm surprised that's not in there. Normally, in the Evaluation Report, there is a separate section that goes through and discusses each of those concerns.

CHAIRMAN ANDERSON: Recognizing

the --

DR. NETON: We'll go back and look and make sure. If it's not --

MR. PROVECCHIO: Right. Well, the next one included an allegation of negligence and exposure to contaminants, the worker occupational category and exposure assumptions may not be consistent with the claimant's duties that were performed.

So this again deals with listening to what the petitioners have to say and being able to respond specifically to their comments, and not overlooking them and missing a concern that was raised.

In Concern No. 5, again the actual conditions and incidents on the site needs to be addressed with respect to a possibility of acute exposures and criticality incidents that are questioned by the petitioners.

The last one, Concern No. 6, deals with allegations of falsification of data and fundamental disregard for human life and lack

of quality control. These things, I think, are very important to be specifically addressed, how they're handled carefully and not disregarded at all.

So I think the exposure of all of our work to the petitioners' interpretation of adequacy and being respectful of their concerns, whether they have great validity or not, is something that we need to address.

DR. NETON: I'm looking through our section that addresses the petitioners' concerns, and there are seven of them listed. None of them match up with the ones that SC&A apparently evaluated. So maybe there are additional things in there that you guys, pieces that are -

MR. ALLEN: I'm sorry. This is a long write-up, if I remember right, and it's essentially this is your version of parsing that out --

DR. MAURO: Absolutely.

MR. ALLEN: -- into different

issues, and I think this was our version of parsing it out. I know they don't match up well, but we can certainly look at that and make sure they're --

DR. NETON: A couple of these I could see where they're -- they sort of overarch both issues, but they did not get into the specifics, as Joe just did. We'll look at it and see where we did or did not address those. That's reasonable.

MR. ALLEN: Yes. I'm not sure how to go about addressing them. I mean a number of these were like the criticality accident was a real accident. It does involve one of our claimants, but it happened at their plant in Rhode Island, not at Hematite.

It's not something -- it's not something I really want to put in the Appendix it's very -- but some sort of way of addressing it, possibly in a letter to the petitioner or, you know, making sure it is addressed in the ER -

DR. MAURO: I think you bring up a very important point. The petitioners submit their petition. It's granted, and the ER comes out. The question is to what extent do you explicitly address it and what vehicle is used to make sure that the petitioners are heard?

DR. NETON: Yes. I think it needs to be in the Evaluation Report, not necessarily in the Appendix.

CHAIRMAN ANDERSON: Yes.

DR. NETON: We don't need to address criticality accidents that never happened or didn't happen in the facility.

MR. ALLEN: And there's a number of them about beryllium.

DR. MAURO: And I think it's satisfying for them to know that we looked at it, we thought about it --

DR. NETON: And so I think what we'll point out here is that we probably didn't do as good a job as we needed to

address all of their concerns in their petition.

CHAIRMAN ANDERSON: It was a long petition. There was a lot there.

MR. PROVECCHIO: If I could just add one more point. For that particular issue, you know, Concern number 5, there were six different locations where that was alluded to, which was consolidated into one concern. Each one of these concerns was a reflection of multiple locations throughout the petition document, that came up with the same issue.

DR. NETON: So what we might do is have another section that is a roll-up of SC&A's comments.

DR. MAURO: You might find that in the very back of our report, there's Attachment A, where Joe -- the six that we just talked about actually is a condensation of three pages of where we tried to take all 97 pages and create this, sort them all out, so that it's -- it was really a two-step

process. So this might be helpful.

DR. NETON: That would be, yes.

CHAIRMAN ANDERSON: Any others?

MR. KATZ: So I just was unclear. Is this going to be then a revision of some piece of the SEC Evaluation Report, or just -- because I don't know. It seems to me our main concern is that the petitioners get responded to, in effect, for their concerns and if it's not in the Petition Evaluation Report, I don't know, unless you're going to do some -- it seems like it needs an addendum or something to more thoroughly respond to the concerns that they raised. Otherwise, I don't know how you -- or a document that just gets sent to the petitioners that goes through these -- that's separate, but you think you'd just tie it with your Evaluation Report.

MR. ALLEN: I mean I -- that's the part I'm struggling with, too, you know. I didn't want to put it in the Appendix if it's not relevant. I was kind of saying a letter.

Jim was saying an addendum to the ER.

MR. KATZ: I'm mean it's irrelevant in the sense that they raise these as concerns, and all you're doing is saying -- in some cases you're saying this didn't occur at the site. This is why it's not addressed here. That's a response still. It still acknowledges that they raised the issue and you've put it to bed in a sense -

CHAIRMAN ANDERSON: And evaluated it.

MR. KATZ: You don't have to go into detail when you respond to it.

DR. NETON: Well, here's the situation. I guess the scenario would be if we revise the Evaluation Report, then that would -- we'd have go all the way back through the process and re-present, I think, Revision 1 of the Evaluation Report to the full Board.

MR. KATZ: But if this is just really an Appendix to make sure that you've buttoned up your responses to -- because you

have some, you said, responses to the petitioners' concerns. If this is just, in a sense, trying to do a more thorough job of accounting for those and it doesn't change anything in the Evaluation Report, I don't think you have to re-present to the Board on that. I think it's really just responsive then to the petitioners.

DR. NETON: An addendum or something.

MR. ALLEN: A separate supplement to the ---

(Simultaneous speaking.)

MR. KATZ: No. I mean there are distinctions, I know, in how you term the document. But it should be tied somehow with the Evaluation Report.

DR. NETON: No, I mean and it's mostly because we want to make sure we have a good record of this. We don't want to have loose documents hanging out.

MR. KATZ: But it's not that

different from when SC&A does these appendices for their worker interviews. They come in later from their reviews, but they don't get -

DR. NETON: We'll work out the mechanism -

MR. KATZ: -- necessarily presented separately.

DR. NETON: We'll do something in writing, and my guess is it would be some sort of a supplement to the Evaluation Report.

MR. KATZ: Okay. Now we're finished with United Nuclear.

CHAIRMAN ANDERSON: Okay. So for the next 15 minutes or 20 minutes or so, let's start with Electro Met.

MR. THURBER: Okay. Everybody has the matrix. We reviewed our findings on Electro Met at the last Work Group meeting. Subsequent to that, Sam Glover provided some preliminary reactions to our findings, and those are included in the column headed NIOSH Initial Response.

At the last meeting, we agreed to do two things. One was to supply NIOSH with our spreadsheets where we had come up with some different numbers from those that were included in the original NIOSH report, and we did that.

The second thing is that we said that we would provide a summary of the interviews. That we have not done yet, but the status is as follows.

We conducted a total of six interviews. I believe two were of petitioners and the other four were former Electro Met employees. We have prepared an interview summary. It is now at DOE for approval, so it should be forthcoming very shortly.

We will provide that summary to the Board initially, but we'll incorporate it ultimately as Revision 1 to the Electro Met report, where we will replace the existing Appendix E, I believe it is, which contained the first interview only, with the summary of

the interviews.

I would caution people when they look at those, the interview summaries, to not confuse some of the statements which clearly related to the metallurgical plant, with what went on in the Area Plant. So you know, workers in some cases were clearly talking about what went on and making ferroalloys.

And so -- and we didn't, obviously didn't try to guide the interviews and so one should read them with that proviso in mind.

That's really, I think it's probably best to pass the ball to Sam at this point because he has, as I say, has come up with some preliminary responses here that you may want to go through.

DR. GLOVER: I think we can go through these fairly quickly. As we discussed at the Board meeting, we didn't proceed -- a lot of analytical things because we had a large data collection that happened at NARA and the other activities.

So one of the things we did, and I was -- you guys had some different numbers than we had. The first thing I did was to have ORAU go back and collect all of the data, go through every SRDB and put that into a spreadsheet. Now I waited to evaluate it because I wanted to make sure the NARA stuff didn't have more.

Data was collected in that, and we had to compare it against those listings to make sure there was nothing new. So I think we have probably a pretty good setting.

It has all of the bioassay data; it has all of the external dosimetry data; it has ring data; it has surface contamination numbers. So we can look at the breadth of it because there are some -

CHAIRMAN ANDERSON: Wasn't there new data?

DR. GLOVER: What's that?

CHAIRMAN ANDERSON: Was there additional data that you got from that?

DR. GLOVER: From what they've looked at, it doesn't look like anything since July or August has come in new. So it looks like that that data we have -- now there's some descriptions in there that's new about the types of data that was collected.

So there's several hundred new reports, and some of them are descriptive in nature, but not analytical numbers, you know, not more bioassay samples. I will say that there are, and as we discuss the findings, I have maybe perhaps a couple hundred more bioassay samples than say the numbers you started out with.

So trying to point, compare exactly the number he got versus the number I got, well I want to understand conceptually maybe why we are different, why we had a different number. We may not come up with that same number now because we may have more data.

Like now we have bioassay data in

43 and 46, I think, when we didn't have any before. So there's some more numbers, and we can take a look -- or it's air data, whichever. I have to look at the spreadsheet that we can compare against. So maybe just after the responses and we can kind of -

CHAIRMAN ANDERSON: Sure, yes.

DR. GLOVER: So last time, we had talked about the DOE facility, about Electro Met and how people were included. As I said then, it is a DOL function. We contacted the Department of Labor, and right now what they do is they go to Electro Met and Electro Met says -- they go to their database and they put the people in there or not.

If we get them, as Dave said when we were here last time, we're going to analyze them. We're going to have to do a dose reconstruction based on what we understand. So their response back to me was, you know, it's pretty limited what DOL is capable of doing -- what Electro Met is capable of doing.

DR. MAURO: Could I just put a little qualifier. This is a concern that Bill and I talked about quite a bit. When we -- and we're going to get into it -- the specifics of the areas where there may be softness in your ability to reconstruct doses, in the Area Plant, you know, what data you have, now you obviously have more data, which may help solve that.

And of course this could move in a direction where the Board and the Work Group may decide well maybe we have an SEC here, whether or not.

DR. GLOVER: Sure.

DR. MAURO: The thing that is, I think, very important for this Work Group is if all of Electro Met is on the table, I don't know the difference in numbers of people. But I looked at the map. The Area Plant is like a postage stamp on the United States.

So I don't know how many different, the numbers of people involved.

But if the boundaries of the site of concern is not the Area Plant but is the entire Electro Met facility, Bill, you probably have a feel for the numbers of people we're talking about, the differences, thousands? It's enormous.

DR. GLOVER: Yes.

DR. MAURO: So I think this is very important.

DR. GLOVER: Well, I would say that it's not -- we don't try to encompass the activities that would have happened at the rest of Electro Met. It is a DOE site, so the DOE encompasses the activities we're trying to bound.

It's just that they may be elbow to elbow because there may be several -- now that being said, and I haven't had time to vet this with my colleagues because I was going through some different -- we have all the SRDB numbers, and I was showing Bill some things.

We actually have a 30-page listing

of what may be all of the employees in Electro Met at the DOE site because they actually say from 40 -- here's all the guys. Now we haven't given that to DOE or DOL, so they actually talk about their job titles, how long they worked in different occupations. So that's something that I must say is new, as I was going through some data that ORAU provided.

So we'll have to see where that goes. But there is, I gave him the SRDB number for that, and it's about 30 or 35 pages of names and when they were employed and what they did. So but I did clarify with DOL, and these were initial responses that were generated last time.

I will certainly update them to work through there. Does that -- maybe you want to have some more discussion on Finding -- so that was Finding 1. I'll include the email from the Department of Labor, what their response back was, and certainly we will

provide anything that we find that could be of help to DOL. We'll give that to them.

CHAIRMAN ANDERSON: So it may be able to define the workers who we're actually in the Area Plant.

DR. GLOVER: That is their concern. They may say -- they still -- that is still their --

CHAIRMAN ANDERSON: They declared -- the whole Area -- the whole Electro Met.

DR. GLOVER: No.

CHAIRMAN ANDERSON: No?

DR. GLOVER: They contact Electro Met and ask them if they work there. Electro Met, you know, at the DOE site, Electro Met -- that database may be so primitive that they cannot put them in one facility versus the other, and they just say that this is the way it is.

So that's the ability that they're able to differentiate. So I can't -- if they put them and they give it to us for dose

construction, Dave is going to --

MR. ALLEN: The assumption is they're in the Area Plant.

CHAIRMAN ANDERSON: Yes.

DR. GLOVER: Because they've qualified them as DOE employees.

MR. THURBER: Because they worked at Electro Met, period.

MR. ALLEN: That just comes down to how DOL identifies as them as a claimant, but as far as what we have to estimate, it's the Area Plant.

DR. MAURO: Do we see any cases where when we went in to do the DR review or look at the work, that we felt that the person didn't work at the Area Plant?

MR. THURBER: Yes. We covered some of this in our review report. One of the petitioners, based on the evidence that was available -- was not clear that her spouse worked at the Area Plant. There was -- actually, there was a dose reconstruction,

too, that we looked at.

It was pretty clear that the claimant did work at the Area Plant, worked at Electro Met. So there have been several instances of this.

CHAIRMAN ANDERSON: That's just an anomaly in this system, that we really have a problem we can't really deal with.

DR. NETON: They're -- employee under this program, by definition. They work in this facility.

CHAIRMAN ANDERSON: Yes. We can't --

(Simultaneous speaking.)

MR. ALLEN: But you don't -- I mean it comes down to, you know, it sounds, I don't know, it sounds heartless or maybe not. But it comes down to it's not our problem. If DOL gives this to us, they are saying they worked in the Area Plant.

If it's their error that that occurred, then -- if we saw something, we can

maybe try to say hey, here's some information. But we never have done that, not with Electro Met.

DR. MAURO: When we -- audit and if we see that, we come to that -

MR. ALLEN: But it comes down to the claims examiner's decision on whether or not, you know, they're saying that's a covered employee or not.

DR. NETON: Now what's the definition of the facility?

DR. GLOVER: It is -- they built -- DOE built a little building on Electro Met. That is --

DR. NETON: But the facility -- what's the site definition for Electro Met?

DR. GLOVER: It's a DOE site, based on the days -- the dates that that plant was owned by DOE.

MR. THURBER: It's all employees who worked at Electro Met, is the definition.

DR. MAURO: They opened it up.

DR. NETON: No, that's the SEC definition. What's the facility definition by the Department of Energy website. A real similar situation at GE. The GE covered facility is really the AEC operation of the DOE that occurred in that little --

MR. KATZ: If you have, and I'm just curious about this, and maybe Jenny needs to respond. If you have definitive information as opposed to speculative information, if you have definitive information that a person never was, say, in the building of concern, it seems to me you still -- DCAS could still say there's no radiological exposure in this case. Couldn't you? Or not?

MR. ALLEN: No, the truth is it's not so much radiological exposure. It is they're not a covered employee, and that's not our jurisdiction.

MR. KATZ: Okay, but I'm not saying to say that they're not a covered

employee.

DR. NETON: But if they're a covered employee, by definition they had work at this covered facility.

CHAIRMAN ANDERSON: They won't have any biomonitoring.

MR. ALLEN: The truth is I'm not sure -- I mean there's some -- some that look pretty much like they were. I don't know how definitive they're admitting it necessarily -

(Simultaneous speaking.)

MR. KATZ: That doesn't make sense to me.

(Simultaneous speaking.)

MR. KATZ: No, I understand you. NIOSH doesn't determine who's a covered employee. Here's what I'm asking you.

CHAIRMAN ANDERSON: Wait, wait, wait. Are we able to capture all this?

MR. KATZ: We can't. We have --

CHAIRMAN ANDERSON: Too many talkers.

MR. KATZ: -- conversations going on.

CHAIRMAN ANDERSON: Yes.

MR. KATZ: Here's my question. I'm clear about they're a covered employee; they have a right to a dose reconstruction. But if our dose reconstruction method is a method that applies to one building, and you have definitive information they were never in that building, why would you apply the dose reconstruction method for one building to that person, when you know they never were in the building?

Why wouldn't you say this person, yes, he's a covered employee but has no radiological exposure because they're not in that building?

MR. ALLEN: It comes down to how you're defining knowing he wasn't. DOL has said we know he was. By giving us the claim, they're saying we know he was in the Area Plant. That's the covered facility.

MS. LIN: So does NIOSH have this information that -- that points definitively -- they weren't even in that building, they shouldn't be a covered employee. Then they communicate that to DOL, and DOL has to make that determination. So even if NIOSH finds, you know, suggestions or something, it's still up to the DOL to make that determination.

MR. KATZ: Okay, thank you.

DR. NETON: I mean just imagine if it did go SEC, how it's going to be administered. All employees who worked at Electro Met would be the Class Definition.

MR. KATZ: No, I understand that, Because in that case, we don't get the information from the individual that -- DOL doesn't get the information --

(Simultaneous speaking.)

MR. ALLEN: They don't get a lot of information from -

MR. KATZ: Right, no, so I understand what happens with an SEC, but I --

seems like it's a different case when it's a dose reconstruction.

MS. LIN: But when it comes down to it, DOL made a determination, and then we'll just have to say, okay, then we do our best to apply the doses to this person.

CHAIRMAN ANDERSON: It becomes a coworker -

MR. KATZ: At the next Board meeting, we're going to ask DOL to give a discussion about defining Classes and all that, which will be interesting. I think this will sort of get into some of these issues.

CHAIRMAN ANDERSON: Okay. Moving right along.

DR. GLOVER: This should be -- Finding 2 is very much the same way. But everything outside -- is not covered. We have a DOE facility covered -- that was built and operated. In 1953 ownership was transferred; it's done, no residual period.

Activities that happened before

that thing was built, not covered. They're a main plant, and we can pass that on to DOL. DOL may choose to add a AWE facility for what was done.

But that's not part of this activity. But we will certainly follow up in the SRDB information to DOL and let them determine what they may want to determine. That's outside the scope of what we --

CHAIRMAN ANDERSON: So you'll only dose reconstruct for the period that the plant -- the Area Plant was in -- a worker might well have been employed there before.

DR. GLOVER: We would start when that building was built.

CHAIRMAN ANDERSON: Right.

DR. GLOVER: We would end when that building ceased to -- and we -- the two, I got all excited. Oh, there's armies.

There's this research going on before. Then I realized it's outside the covered scope, so you can't do it. So there's

some -- you know, they had some stuff that they did on plants, some preliminary research. It's separate.

MR. THURBER: And in one of the interviews that you will see, the interviewee said yes, there was some work done in the research laboratory, which was building the store before the Area Plant opened. But basically it was some analytical chemistry work and obviously would not have resulted in any significant exposure.

DR. MAURO: But you're saying that's not within the scope of the --

MR. THURBER: It's outside the scope is what I heard Sam say, yes.

DR. GLOVER: As it is right now. I mean if there's information to make the rest of it an -- or something, that's something to give the DOL, make a new AWE next to the DOE site.

CHAIRMAN ANDERSON: Yes. Okay, three.

DR. GLOVER: Finding 3, these are all interrelated. These are the start and end dates, start and end dates. This is a DOE site. The other thing would be related to what DOL would do with any additional information we may have found.

So those are interrelated to one and two, and I don't know if there's a way to have that just encompassed, that we have, you know, extra findings being tracked. Maybe it's just not worth trying to close or open, but it is obviously interrelated to the first two discussion points. So I don't think there's much update for that. Let's see.

CHAIRMAN ANDERSON: Pre '48 data.

DR. GLOVER: Finding 4, working on reviewing all the data. So basically we have, we've read and understood your concerns about back-extrapolating. We have now, I believe, compiled all this data, and it will be my job to put some approaches together and meet with Jim and with Dave, and see what the best

approach would be and how that -- so right now, we're not be to speak to that. Right now we have compiled the data.

CHAIRMAN ANDERSON: But you're going to work on a justification.

DR. GLOVER: To see if that approach is appropriate.

CHAIRMAN ANDERSON: Yes, right, exactly.

DR. GLOVER: So that is the current state that we had. We've updated the data and it's the time to develop an approach.

DR. MAURO: I consider this to be one of the most important issues because earlier, when we looked at it, the concept was the `48-`49 had data; `43 and `44 didn't, and there was going to be an extrapolation. But it was your position at the time that there's every reason to believe that the later data could be applied to the earlier years.

But we did point out that there was a year, 1947, where clearly something

happened that changed things, and it's going to be difficult to extrapolate given that change. Now that you have data for the earlier years -- what I'm getting at is this could have been a very important SEC issue, I guess is what I wanted to say.

DR. GLOVER: It may still be. The process may not be covered. So all those things have to be evaluated, whether you have this back extrapolation capability. So we do have some early urinalysis data, and --

CHAIRMAN ANDERSON: We do have new data that you can work with, so that -- yes.

DR. GLOVER: It's compiled in one SEC, so we can all look at it and make it easier to determine what may or may not be a reasonable approach. So that will be our next big step, is to come up with the -- to review that against the appropriate approach.

CHAIRMAN ANDERSON: Okay, number 5.

DR. GLOVER: I think that this

would be something we would do very late in the change. We agreed that we want to make sure we fixed any inconsistencies, but that we're not going to -- until we work out the approaches, there's not much sense in doing anything with 5. Right now, there's no action until -- that would be done later. I think 6 -

CHAIRMAN ANDERSON: Same thing.

DR. GLOVER: Now this is -- as we've talked about -- they compiled it. But it does need to be carefully reviewed as to whether it's BZ process or GA.

They've done some initial markings on them, but it does need be very careful about the type of data, and if it's really a fixed head sample or if it was truly like a HASL type BZ data.

So there's different kinds of BZs, what they may call a BZ. So I do agree that that -- part of our Finding 6, we certainly, as part of our data analysis, we'll be looking

at that. All right. Seven.

Well this -- we'll have to see what the new found data works out. With that SRDB, see if that sheds any light on some of the titles and jobs that they were doing. It may help fill in some holes about the type of occupations that we have.

But I haven't done any additional work with that at this time, so I haven't proceeded. We've moved Finding 7 ahead.

MR. THURBER: Is there any advantage or is it a bad thing to think about, to minimize the number of job categories? Like simplistically, operations people, office people, which tends to circumvent the case, well, was this guy really a laborer or was he a supervisor or was he an operator, for -- and particularly for a small facility like this, where there were only 70 people maybe in the Area Plant. I don't know. A question really.

DR. GLOVER: We will have to -- we'll make sure, as we develop our approach,

that we --

DR. NETON: Is this all related to the ability to develop coworker model? Is that what we're talking about here?

DR. GLOVER: Sure. Yes, how to set that analysis up, yes.

DR. NETON: And how many workers weren't monitored and what we're going to do.

MR. THURBER: Yes, and were they -- was this a guy a laborer one day and an operator the next day and --

DR. NETON: Well, we don't know. We're going to assume he was probably an operator.

MR. THURBER: That's why I say, if that's the case, you know, why bother with these?

(Simultaneous speaking.)

DR. NETON: Did we propose four or five different --

DR. GLOVER: We had four or five different. We have a supervisor, an operator

--

DR. NETON: Okay.

MR. THURBER: I'm sorry. I didn't --

DR. GLOVER: Sort of the Appendix C approach or sort of the Battelle approach.

MR. ALLEN: When we're actually doing the DRs, they get the benefit of the doubt on that, and in all honesty, it's kind of a lessons learned to have something there, so when you get the one that says they were a bookkeeper in the admin building, you don't have to give them operator dose, when you only have one option --

MR. THURBER: No. That's why I say, but if you narrow it down then --

MR. ALLEN: Yes, whether we got the right separation --

MR. THURBER: Fewer things for people to debate about.

DR. GLOVER: So we do understand your point, and as we develop our approach,

we'll make sure that we look at what's appropriate. All right. Finding -- I think this is where we --

DR. NETON: Is this like rank order versus curve-fitting kind of thing?

DR. GLOVER: Yes, all right.

MR. THURBER: It was just interesting to us, when we did the analysis, where you do the calculation when you take the sum of the squares and all that sort of thing, as compared to the curve-fitting, and you get significant differences actually.

DR. NETON: That's not usually the case for internal data. For internal data, usually the 95th percentile fit is higher. I've already done that for all the other coworkers, and what happens is you get towards the top and there's a tailing off because people can only get so much intake, and then you go out to the 95th and you end up with a higher, in this particular case. Probably based on the limited number of data, I don't

know.

MR. THURBER: Probably.

DR. NETON: But it's worth looking at, and we'll take that in consideration.

DR. MAURO: When I was reading this, I noticed there's a large section dealing with the DWE concept that came out of here, and the DWE concept, you're probably not aware of this, only recently has emerged as something that's of great interest, and this is to imply here.

During the Weldon Springs Work Group meeting, the discussion came up related to -- in fact, I brought it up related to do you use the classic HASL approach to do DWE, and everyone agrees that that's good industrial hygiene. Take these little measurements and process them with HASL protocol.

The point that was made, and I think it was originally made by Arjun on Mallinckrodt and it has really reemerged, is

that does the classic HASL approach, is it appropriate to apply to this program. SC&A's position is no, and the reason is that the HASL approach will come up with a central estimate for a particular job, a best estimate that is reasonable to give you an indication of these are the kinds of intakes -- DWEs, workers of this category, are expected.

However, there may be many workers in that category, some of whom could be substantially higher and some lower, as evidenced by the samples that were taken for a given task, sometimes spread over two, three orders of magnitude.

Now where I'm going with this is Bob Morris answered very nicely. He said "Well, we're not doing that. We're not doing that. We're using the Davis and Strom approach from the 2008 Health Physics journal," which is a much more sophisticated treatment of the problem, where they apply Monte Carlo.

So and now what we're seeing, we're seeing we're in a transition mode. I think you're in a transition mode, whereby you're using the Strom and Davis strategy, which we reviewed as of yesterday, and found it very compelling.

I think that the degree to which that applies here, I guess this is something new that's not in the matrix. I'd like to put it on the table. When you look at the issues associated with the DWE work that was done in this case, factor in the Strom and Davis paper as dealing with this business of uncertainty.

I think it's important because it's a way -- that's why he wrote the paper, by the way.

DR. NETON: Well that was specifically done on contract to us.

DR. MAURO: And it's great work, and we reviewed it very carefully. You're going to be seeing some work that -- because it's related to Fernald and Weldon.

DR. NETON: I'm not working on either of those.

DR. MAURO: Yes, I understand.

DR. NETON: Conflict.

DR. MAURO: But I wanted to bring it up, and it applies here.

DR. NETON: Well, that's good. I'm glad you mentioned that.

MR. THURBER: And indeed, part of the -- some of the cases they looked at included Electro Met data in that paper.

DR. NETON: I just want to mention --

MR. KATZ: Yes, can I -- I was going to mention it. It's -

CHAIRMAN ANDERSON: Yes.

MR. KATZ: -- and we have a certain time frame for -

DR. MAURO: Yes. We've got to come back at one.

MR. KATZ: So we can just break this and resume this after we do Hooker.

CHAIRMAN ANDERSON: Yes.

MR. KATZ: Okay. So we're breaking for lunch, everyone on the line, and we'll be back -- we're going to try to be back promptly at one, since we have folks from Hooker who want to listen to that conversation. Thank you.

(Whereupon, the above-entitled matter went off the record at 12:03 p.m. and resumed at 12:59 p.m.)

A-F-T-E-R-N-O-O-N S-E-S-S-I-O-N

12:59 p.m.

MR. KATZ: So this is the TBD-6001 Work Group, and we're just reconvening after lunch, and let me check first on the line for our Board Members.

MEMBER FIELD: Bill Field.

MR. KATZ: Welcome back, Bill, and, Mark, do we have you back too?

MEMBER GRIFFON: Yes, I'm here, Ted.

MR. KATZ: Great, and then also we were expecting -- so we were planning to shift to Hooker, but I want to check on the line and see.

We had two people from Hooker who were going to join us for this discussion. Are they with us? Geraldine and Mary. Okay. I wonder if we shouldn't just wait a minute at least, since we set this aside for them.

CHAIRMAN ANDERSON: Are there any other Electro Met?

MR. KATZ: Oh, yes. So we could continue. I just didn't want to get deep into Electro Met if they're -

CHAIRMAN ANDERSON: No, I think -

MR. KATZ: -- they're going to pop on right now.

CHAIRMAN ANDERSON: It seemed to me, at least my sense was, you've got new data. You're going to be looking at that data and a lot of the other issues are going to be dependent upon how well you're going to be able to use that.

So I'm not sure -- I mean if you want to go through them all, but it seemed to me we were sort of just doing an update.

DR. GLOVER: I think you're right. It should happen very quickly. I think you're right. Most of it is to go to that new data, and I guess for number ten, I think we've got --

DR. MAURO: Yes.

DR. NETON: Well, number nine.

DR. GLOVER: Nine, nine, okay.

DR. NETON: Nine because it says a TBD-6001 issue, since there's no TBD-6001 --

MR. THURBER: Well, if TBD-6001 no longer exists, the issue is irrelevant because all it said was gee, this is not as conservative as TBD-6001. So it just goes away.

MR. KATZ: What issue number is that?

DR. NETON: Nine.

MR. KATZ: Okay, so that's gone, closed.

CHAIRMAN ANDERSON: Ten is the issue of blowouts, yes.

DR. GLOVER: And that's something I'm waiting for interview notes.

MR. THURBER: They don't reveal that there was any major problem, which is consistent with what's been said. As I recall, and you of course will have it to analyze for yourselves, one interviewer said

"well, sometimes the seal would leak," and I presume that there's a seal on the bomb of some kind.

But it was nothing like, you know, the seal blew and we had contamination all over the place. And in another instance, one of the people talked about blowouts, but from the context, it's not clear that that wasn't an explosion in an electric arc furnace, which happens all the time when you get moisture in the furnace.

So it doesn't say anything startling, let me put it that way. But you all will make your own evaluation.

DR. GLOVER: Yes, I mean, we'll see what those interviews have to say and if we need to include those in our approach.

CHAIRMAN ANDERSON: So no residual period.

DR. GLOVER: All right. Eleven is withdrawn because there is no residual period.

CHAIRMAN ANDERSON: Twelve.

DR. GLOVER: 6001. I see if this is -- since withdrawn. I think we'll -- with the updated, it's really just part of that.

MR. THURBER: It's part of the whole data update question.

DR. GLOVER: Thirteen, and that's just -- we'll rewrite this, I mean, saying whether we're not -- we'll make sure that they match.

CHAIRMAN ANDERSON: Yes.

DR. GLOVER: Appendix C, actually we'll write an individual updated -- individual Site Profile, right, Dave? So this will be converted to --

MR. ALLEN: Yes, stand-alone.

DR. GLOVER: Stand-alone. So 13, this will actually become a stand-alone.

CHAIRMAN ANDERSON: Fourteen.

DR. NETON: This is what we talked about earlier.

CHAIRMAN ANDERSON: Yes.

DR. NETON: Photofluorography.

DR. GLOVER: Yes, about whether or not it was really even on site.

DR. NETON: That's our action item for revising six.

MR. ALLEN: It needs to be clarified for sure.

DR. NETON: Yes.

DR. GLOVER: Well, this is a DOE -- one thing I'm going to say about the argument. I hadn't recognized this is actually a DOE site, and the discrepancy here is that it does not use a -- you classified it as an AWE in your description.

DR. MAURO: That's right.

MR. THURBER: That's right. But that was before Ted Katz enlightened us last Working Group meeting, and I probably didn't pick it up.

DR. NETON: We should probably be a little more clear on what we mean when we say a DOE site for photofluorography. We mean a DOE site that had a large number of workers,

where it would be of benefit to use photofluorography.

CHAIRMAN ANDERSON: Yes, cost effective.

DR. NETON: As a practical measure.

DR. GLOVER: So in this small little facility, I don't think there's any evidence that any medical facility was on site --

MR. ALLEN: In all reality, it was probably on the main part of the site, not in the covered part of it. But we don't know that. So we're assuming an annual PA, unless we find something --

DR. GLOVER: But this is related to PFG. We would get PFG at the same time.

MR. THURBER: But PFGs conceptually could have been done at Electro Met.

DR. GLOVER: Little Electro Met or big Electro Met?

MR. THURBER: Electro Met.

(Laughter.)

MR. THURBER: Not at the Area Plant, but you know, at the moment we're talking about the whole facility.

DR. GLOVER: It's still only the activities in that little DOE box. Even though we're putting everybody elbow to elbow in there, it's only what happens in that little box, that little postage size stamp at Electro Met that's covered. So if they go -- as soon as they step outside of that DOE fence --

MR. KATZ: It's not a covered exposure.

DR. GLOVER: -- it's not a covered exposure.

MR. THURBER: I'm sorry.

DR. GLOVER: Electro Met is very confusing.

MR. THURBER: But I thought that the SEC petition dealt with all of the

employees at Electro Met.

DR. GLOVER: They can ask whatever they want, but the only covered facility --

MR. ALLEN: Well, Electro Met that covered EEOICPA's facility is the area of the plant. It is just how you were defining Electro Met. It would not defined as a DOE site if you were talking the rest of -- kind of like Linde Ceramics is really Linde Air. Electro Met in the form of EEOICPA is the Area Plant.

DR. MAURO: Okay, so the term Electro Met is defined as the Area Plant. The fact that there is this other place called Electro Met that is much bigger is irrelevant.

CHAIRMAN ANDERSON: But as far as getting into dose reconstruction, all you have to do is have worked on Electro Met.

(Simultaneous speaking.)

MR. THURBER: That's the rub, whether the two or three thousand people who worked at Electro Met, include the 70 who

worked in the Area Plant well that's the population we are talking about.

MR. KATZ: It's not population based. The question is location-based. So it doesn't matter what happened outside of that plant. It doesn't matter even though all 2,000, DOL may let them all in the door and treat them as if they worked in that little plant, the program only needs to reconstruct doses that occurred in the plant.

MR. THURBER: I understand that but I guess what Sam said is, as far as DOL is concerned all of those two or three thousand people are crowded into that little plant.

DR. GLOVER: We don't know, that is the way -

DR. MAURO: Well there is no way to know for sure that they were kept out, I guess maybe that is a better way to look at it.

MR. ALLEN: Actually I think there is some evidence that there was pretty good

security.

CHAIRMAN ANDERSON: Let's move along. We recognize the issue. Okay next.

DR. GLOVER: This is -- we got new data, whether we'll update our exact numbers, but I will look at it to make sure why maybe there is a discrepancy, so we, you know. So a little education on that. But we're not going to come up with the same numbers because we have additional data.

CHAIRMAN ANDERSON: Right.

DR. GLOVER: Finding 16. This, you know, Jim, aren't you doing some stuff with recasting? Haven't you got another area where we're doing recasting exposures, you know, to the surface?

DR. NETON: Always. The Puzier effect?

DR. GLOVER: Yes, yes.

DR. NETON: Yes. That's a GSI issue. Is it a GSI?

MR. ALLEN: TBD-6000.

DR. NETON: TBD-6000.

DR. MAURO: In general.

DR. NETON: In general, right. Which finding are you looking at, Dave?

DR. GLOVER: Sixteen.

DR. MAURO: Sixteen.

MR. THURBER: All 16 said is in Appendix C, you don't cover dose to the hands and arms, and we think you should. That's all this is about.

DR. NETON: That's something, did we agree? We agreed that we'd do that and consider it.

CHAIRMAN ANDERSON: Seventeen.

DR. GLOVER: I think that's the last one, right?

DR. NETON: No, there's 18.

DR. GLOVER: Oh, there's 18.

CHAIRMAN ANDERSON: Yes, one more.

DR. GLOVER: The issue of the 95th percentile of bounding.

CHAIRMAN ANDERSON: What about 17?

DR. GLOVER: And you said -- you know, seventeen, we've said that we are clearly reviewing the 48 back extrapolates.

CHAIRMAN ANDERSON: So do we have any time line thoughts on where's this fit into your work schedule?

DR. GLOVER: It won't be touched until January. I won't start working that up until January.

CHAIRMAN ANDERSON: Okay.

DR. GLOVER: Because this, I've got to fit this and Laughlin.

MR. KATZ: Does this look like something that could be put to bed, your work in January, within January?

DR. GLOVER: Depends upon how many other fires we have, depends on other places, because we have Sandia coming due in that time frame too.

MR. KATZ: So the question, I mean we can get to it later, but the question will be whether we can book a Work Group meeting

before the February, which is like the third week in February, before the February Board meeting? Is it in early February?

(Simultaneous speaking.)

MR. KATZ: It's not early February. It's like the third week or --

MR. ALLEN: So the Work Group could be early probably.

MR. KATZ: So if the Work Group could be before that, that's the question.

DR. GLOVER: We can send this out in an email and make a decision on this.

MR. KATZ: Or at the end of the day today.

DR. GLOVER: All right.

MR. KATZ: I mean if we can. I mean just where to schedule the Work Group. Chew on that.

CHAIRMAN ANDERSON: We'll probably push a Work Group meeting --

(Simultaneous speaking.)

CHAIRMAN ANDERSON: I mean it's

close to the big meeting.

DR. NETON: Well, if it gets too close to the Board meeting --

CHAIRMAN ANDERSON: Then you can't put it on the agenda, yes. So --

DR. NETON: But we have Los Alamos Work Group scheduled for the 11th.

MR. KATZ: Yes, we do.

DR. NETON: And so the week of the 14th, I think, is the week before the Board meeting.

MR. KATZ: That's right.

DR. GLOVER: That's in February?

MR. KATZ: Yes. If not, say so. If it doesn't work before, then we just need to know that then, and we'll plan for it after.

MR. ALLEN: So just one thing I wanted to point out here, to at least get a feel from this room, is I sent out an email and we intend to cancel TBD-6001.

DR. MAURO: Yes.

MR. ALLEN: In order to do that, I need to revise these appendices, at a minimum change the format so it's not an appendix to a document that's going to be gone, Electro Met being one of them.

I wanted to try to get this done by the end of the year, but for a number of reasons, I really don't want to piecemeal these appendices and change it today, and then change it again two weeks from now.

CHAIRMAN ANDERSON: Yes.

MR. KATZ: Absolutely.

MR. ALLEN: If we're still analyzing the Electro Met or one of these others.

CHAIRMAN ANDERSON: Doesn't make sense.

MR. ALLEN: We might end up putting out to where it's a format change, without changing the numbers, just to allow us to go ahead and get rid of TBD-6001, knowing there's an additional change to come.

As long as there's some text and format without changing the numbers, that kind of piecemeal I can handle a lot of easier than me to start changing the numbers. I just don't want that to be a surprise to anybody, if that's what we end up doing.

CHAIRMAN ANDERSON: Okay.

MR. ALLEN: We will include everything through these audits that we can do. If we can close it out, we'll include it all.

CHAIRMAN ANDERSON: Okay. So let's move to Hooker.

MR. KATZ: Let's just -- let me just check on the line and see if we have either the people from the public from Hooker, who are possibly going to join us at 1:00.

CHAIRMAN ANDERSON: They say they might join us.

MR. KATZ: Yes. One of them said that she might not. She might just --

MS GERARDO: Yes, I'm here.

CHAIRMAN ANDERSON: Good, okay.

MR. KATZ: Okay, so that's Mary.

MS. PAGE: And Geraldine Page is here.

MR. KATZ: And Geraldine's here too. Very good. Okay. So we're ready. We're going to start talking about Hooker now.

MS. PAGE: Okay.

MR. KATZ: Thank you.

MR. THURBER: Everybody has the Hooker matrix. This is new material. We issued our review of Appendix AA and the findings that we arrived at are presented here. We can go through these -- I'm sure that NIOSH has not had a chance to examine these or prepared any responses yet, or I presume that's the case.

MR. ALLEN: I think we're ready to talk to them. We didn't do anything kind of formally.

MR. THURBER: Okay. Well then we'll go through them with that in mind.

Finding No. 1, we felt that the assumption that the required number of barrels could be dumped in a single day was pretty overly-optimistic, since we're talking nominally about 400 barrels, and it seemed like guys would have to really be humping to open and dump that many barrels in a day. So we felt that that number should be reexamined. The second finding --

MR. ALLEN: Yes. That was a fundamental one. It comes out we didn't assume they were dumping 400 barrels. We assumed they were dumping 40 barrels in a day. Your estimate was based on the ten tons per month being the output of the process.

MR. THURBER: Yes.

MR. ALLEN: And ours was the ten tons per month being the input of the process.

MR. THURBER: But if you take the -- they gave you the total output, as I recall, of -

MR. ALLEN: 150.

MR. THURBER: 150 tons, and that's over nominally 15 months. So that's like ten tons a month of product.

MR. ALLEN: It was actually, and I've got it open here; let me find it. It was approximately 150 tons of C2 slag were processed. It doesn't say whether it was input or output.

MR. THURBER: Well, then --

MR. ALLEN: We went back and corrected that.

MR. THURBER: I went back and did some analysis, because this one, even when we were writing the Appendix, this part was not clear.

As it turns out, you can estimate how much mag fluoride was produced in the MED from 1942 and 1945. It was about 150 or 1,500 tons, most of which was at Mallinckrodt, and that was dumped at SLAPS, I believe.

CHAIRMAN ANDERSON: Right.

MR. THURBER: If this were a ten

ton per month output, essentially they would have needed to have an input of the entire amount the MED ever processed. There's no evidence that anything came from Mallinckrodt. It was pretty much all from Electro Met, which was very near the Hooker plant.

CHAIRMAN ANDERSON: Good. If you are on the phone, can you hear us okay?

MS. PAGE: Yes.

CHAIRMAN ANDERSON: Okay, good.

Yes. speak up if you don't, that's all, because people are spread around the room, but the microphones are pretty good, so don't be bashful.

MR. ALLEN: But that --

MS. PAGE: Okay, thank you.

CHAIRMAN ANDERSON: Go ahead.

MR. ALLEN: That little analysis is what finally sold me on it, that the 152 tons total and the ten tons per month was the input term rather than the output term.

MR. THURBER: Okay. It sounds

sensible. I need to obviously go back and double-check the language, but if what you say is correct, then the one percent, I'm sorry, the one day per month would be a reasonable estimate.

MR. ALLEN: I guess that's your item to go back and look.

MR. THURBER: Yes, absolutely.

CHAIRMAN ANDERSON: It's a task.

DR. MAURO: A small task, but a task all the same.

CHAIRMAN ANDERSON: And we'll hold you to it at the next meeting. Okay, three.

MR. THURBER: Okay, two.

CHAIRMAN ANDERSON: Two, two. I'm sorry.

MR. THURBER: Okay. This comment related to the fact that in estimating the exposures, they only really looked at the barrel dumping operation and did not look at the issues of feeding the slag through the digesters, filtering the slag, I'm sorry, yes,

filtering the output from the digesters, re-barreling it for shipment, those kind of things.

So our thought was that you were missing some exposure by not including all of those operations.

MR. ALLEN: Okay, and you did a calculation here. You got 146 picocuries per day in your write-up, and that is how we did that.

The Appendix, though, has 156 picocuries per day for the final answer, and the remaining came from a semi. The 95 percent of the time was a filter operator. So it was considered in there.

MR. THURBER: Okay. It hit that --

MR. ALLEN: Yes. I mean once you actually put the math into the Appendix, it's hard to put all that in there. I think it was mentioned in there, but it's text, it's not math.

MR. THURBER: Okay. Well, that explains why those two numbers are different too.

CHAIRMAN ANDERSON: So have we resolved that, do we think?

MR. THURBER: I believe so. Again, I want to take a close look at --

CHAIRMAN ANDERSON: Yes, all right.

MR. THURBER: But yes, it makes sense.

MR. KATZ: SC&A. We'll recheck that one too.

CHAIRMAN ANDERSON: Yes.

MR. THURBER: Yes, and you said it was filtration was 95 percent of the time.

MR. ALLEN: Yes. We used a filtration, because the -- now I'm trying to remember what the task was called in 6001.

MR. THURBER: There is a filtration task there in the scrap recovery. So I suspect that's probably what you used.

MR. ALLEN: And that seemed to be the most appropriate, because the dumping was already covered. It goes into a passive tank, which is low airborne and a liquid system, and the next time it's close to dry would be the filtration, and that's -- even then, it's kind of a cake.

MR. THURBER: It's a wet cake. Indeed, I agree. Okay. Number three, we felt that the intake values were -- well, we had some problems with some of the assumptions, and we made some alternative assumptions and we concluded that your numbers were conservative, but we felt that they might have been unrealistically high as compared to the alternatives.

You know, we had a big discussion about this this morning as to what is conservative or overly-conservative, and certainly some of this is in the eye of the beholder.

But the -- given the fact that

there is so much attention being focused on surrogate data and whether it's used realistically or not, we felt that that's something that ought to be examined a little more closely.

MR. ALLEN: And we, I mean we considered a number of things, and in the Evaluation Report, you'll see where there was, and I can't find it right now. But I believe it was some 400 EPM per cubic meter from Electro Met from this material. We used 822.

MR. THURBER: And again, we did not have the benefit of the Petition Evaluation Report when we did this. Certainly, there is more and I would say better quality data in the Petition Evaluation Report than was used here, and it's certainly an improved document with better data, in my view.

MR. ALLEN: Yes. We always seem to find more as we go.

MR. THURBER: Yes.

MR. ALLEN: But the truth is, when you start talking about surrogate, I mean our opinion where there is a little more robustness to something that's sampling many plants or whatever, like the document used for TBD-6001, you know.

There's, you know, several plants, et cetera, versus one or two samples from something that might be a little more similar. It's kind of -- it's half a dozen of one, six of the other type of thing, you know.

MR. THURBER: To some extent it's in the eye of the beholder. The Finding 4 --

MR. KATZ: Well can I, before we go on to four though, what is the -- so where do things stand with three?

CHAIRMAN ANDERSON: As far as the -- unrealistically high.

MR. ALLEN: Well anyway, it's conservative. It was intended to be bounding, and it's probably high. I think we would disagree with the unrealistic adjective.

CHAIRMAN ANDERSON: Well, it would probably help if you could maybe elaborate on that as to --

MR. ALLEN: Well, I think some of that was in the ER, and you said you didn't have that when you --

CHAIRMAN ANDERSON: Okay.

MR. THURBER: No, and nor were -- nor have we been commissioned to review the -- we reviewed it in a very cursory manner, but we did not -- we were assigned to review the Appendix only.

MR. ALLEN: Okay. I mean right now, we're kind of standing, as Bill said, it's -- unrealistic is in the eye of the beholder.

CHAIRMAN ANDERSON: Yes.

DR. MAURO: What might be helpful is what we do, because we usually ask to do this. Compare whenever you used surrogate data, compare that use against the criterion. For example, in a case where you're using

surrogate data from another site, built into the process should be enough conservatism, because you're coming from that site. You don't have your own data to temper it.

So one could argue yes, maybe it might be unrealistically high, but since we don't have any data on our site, one could argue we erred on the high side of it. That would be one way of almost accommodating one of the acceptance criteria.

Yes, it is more conservative. Now of course later on, the last criteria is plausible circumstances. Now and this question's asked of us, and we try to address it, but I think maybe you should have the first run at it, because when you do -- in fact, I'll make a suggestion here.

When you do use surrogate data, as has been done here, it wouldn't be a bad idea to put it to the board's criteria. Go through it the way we've been doing it when we've been asked to do it, and okay, surrogate data was

used here, and that each of the criteria, exclusivity, timely, the timing, the plausibility.

You know, in any event, maybe four or five criteria, having that, articulating that, because eventually we're going to have to do it. I think it would be better if you would do it, as part of the basis upon which you're building your case.

CHAIRMAN ANDERSON: Have we already done that internally? I thought we did that internally.

DR. NETON: I mean it's something we do internally against our draft criteria.

MR. ALLEN: It was our criteria before the Board adopted it.

(Simultaneous speaking.)

DR. NETON: What surrogate data that we're talking about here now?

MR. THURBER: It's a May 2010 document.

DR. NETON: I know. But I'm

trying to think about this particular value that we're discussing is at the --

MR. ALLEN: Is the, what we use for drum dumping and --

DR. NETON: Okay.

MR. ALLEN: The TBD-6001.

DR. NETON: All right, and that was taken from the --

MR. ALLEN: I get the two mixed up, but Harrison-Kingsley or --

DR. NETON: Harrison-Kingsley or the other report?

DR. MAURO: Christifano.

DR. NETON: Christifano, I think. Just the final number of sites over a 20, over a ten-year period or so.

DR. MAURO: Yes.

DR. NETON: Yes. I think we've done this, so I don't have a problem with that -

MR. THURBER: I guess basically the argument that we made here was the

specific data that were selected from Christifano & Harris were for scrap recovery, and in particular it was a guy that was handling trays of oxide, and that didn't seem to be a very good analog to the operations that were being done at Hooker.

So we said gee, there are some other operations out of Christifano & Harris relating to ore digestion and things like that that we think are better analogs, and require fewer assumptions, if you will.

And by doing that and not having to make some of these other assumptions, we convinced ourselves that your numbers were certainly bounding, or they were very bounding.

DR. NETON: I think that's fair.

(Simultaneous speaking.)

DR. NETON: We'll certainly share what we've done.

DR. MAURO: Yes. I think the plausibility -

DR. NETON: It may be in light of what we're hearing from you guys too, because we just sort of didn't consider --

DR. MAURO: There was a time when you would introduce a bounding set of circumstances and, you know, that would be end of it.

It suggests that we're convinced that you placed a plausible upper bound. I mean we used those words real loosely, but plausibility has become really a key word, plausibility of circumstances.

In other words, can the circumstances that existed at this facility handling that material, this is dolomite and the other, can it be plausibly characterized by using the scrap -- this is uranium, as opposed to this residue.

And one could say "no." You know, the two are very much different, you know. One has very little uranium in it and one is, I guess, all uranium or close to it. So I

mean it leaves you in a place where you're going to have a -- you're going to have a tough time getting by the plausible circumstances.

MR. ALLEN: I think plausible argument has to be how high the number is though. I mean if, in this particular case, we end up with a number that's fairly low, that we're saying is possibly unrealistically high.

MR. THURBER: Well, I know. But --

(Simultaneous speaking.)

MR. THURBER: We understand that. I guess really more the focus is you could come up with something totally off the wall of a process that's totally unrelated, come out with a nice big number and say it's bounding.

MR. ALLEN: Right, I would agree if it was big. But I'm saying you could come up with a very low number that everybody's agreeing is high. That's a different story.

DR. MAURO: Is it?

MR. ALLEN: Yes.

DR. MAURO: I don't know.

MR. ALLEN: It is. Everybody agrees it's high. I mean if you've got one millirem per year external dose rate and everybody agrees that's a high number, is that really implausible?

DR. MAURO: Well, now you're going to, you know, how do you trigger the one millirem per year number.

MR. ALLEN: Well, you could call it ten millirems per year. I mean at some point, it's so low that it's not implausible.

MR. THURBER: I agree with that. Unfortunately, that logic doesn't exist in the criteria that we're asked to evaluate against.

DR. NETON: Well, it certainly exists in our version. Our version talks about plausible bounds being you can't, you know, you'd have to evaluate it against certain things, like is this a lethal dose of external exposure you're providing, or is this

--

MR. KATZ: I mean it says are you -- have you estimated the maximum doses that could have occurred under plausible circumstances at that site. But so if what they did at that site under plausible circumstances as opposed to having them imagining that they did some other crazy things there.

Under the plausible circumstance of their operations, does this estimate bound then? That's the question.

DR. NETON: So it certainly bounds it. The question is --

CHAIRMAN ANDERSON: How closely.

DR. NETON: Yes. I mean we're splitting hairs here. I mean how close is close to make it a bounding -- I can see if it was if we used 50 milligrams per cubic meter from Bethlehem Steel, and said okay, there's a choking atmosphere of uranium in the air, and it's certainly no higher than that. I would

raise the red flag on that one and say now come on. That's not even close.

But if you're drumming stuff and now it gets to the matter of the relative concentration of materials, and if you have to account for certain things like air circulations that aren't built into these calculations.

You know, there's some uncertainties in there that are inherent that we feel are comfortable picking a higher bound and saying it's in there, you know. I don't know. I agree with Dave. I mean if you get a very low number and we're arguing whether it's -- everybody agrees to a low number, but it's higher than what you would expect there, is that -- does that give you a situation where you can't bound the dose? Then you get -- if that becomes -- let's follow this through. If that becomes the basis for SEC, now you've got a health endangerment issue, because the SEC criteria is that if you can't bound it, health

is essentially automatically in danger, because you can't put this bound on the value. So --

MR. THURBER: We're not saying you can't bound it. We're convinced you can. We're just arguing about whether this is the right way to bound for this particular case.

DR. NETON: Well then see I think then we need to take plausible off the table and say that you don't think it's a realistic value, and we should lower our value, and it's a non-SEC issue.

MR. THURBER: We're not evaluating the SEC.

DR. NETON: Well, that's true. This is not an SEC.

MR. THURBER: You know.

CHAIRMAN ANDERSON: And the question is do we want to charge --

DR. NETON: If you take plausible off the table and say you feel it's an unrealistically high value.

MR. THURBER: Which is what the words were that I got chastised for, about unrealistic.

(Laughter.)

DR. MAURO: SEC is at play and we're trying to advance, and advancing our Site Profile Review, there was a back room objective. Maybe we could say something intelligent about the SEC also. So it's not a bad idea to talk about --

DR. NETON: Well, I mean we've got to talk about it eventually. In this context, I would say that you feel the number is high.

CHAIRMAN ANDERSON: And there might be better choices.

DR. NETON: And there might be a better choice to do.

DR. MAURO: For the surrogate data.

DR. NETON: And I think our response would be we'll take a look at it.

MR. THURBER: And certainly with

the new data that you have uncovered for the Petition Evaluation Report, that makes a much more robust argument, to me.

MR. ALLEN: Yes, and that's what I was saying. It seems to fit better. It doesn't seem to be as robust as the -- I can't even say the name.

DR. NETON: Christifano.

MR. ALLEN: Christifano, yes.

CHAIRMAN ANDERSON: Number four.

DR. NETON: So we're going to take a look at it. I mean that's the action.

CHAIRMAN ANDERSON: Observation.

MR. THURBER: There's an error in the table. I think David and I talked about this on the side at one time, that it needed to be fixed, I think is the bottom line.

MR. ALLEN: And yes. We talked about it and I agreed, and I'm trying to remember what this one was. Okay. I remember this one. It was simply an error in a spreadsheet that got carried forward.

As I said, we're revising the appendices, so we'll correct that.

CHAIRMAN ANDERSON: Okay, next.

MR. THURBER: Number five, it relied on some information in TBD-6001 to do the, I believe this is the external dose, and we thought it was again kind of a stretch to use the numbers from TBD-6001, which dealt with drums of uranium, and then try to extrapolate down, if you will, to drums of slag, and that a more robust approach would be to use MCNP or something like to generate the numbers on the basis of the real source that we're talking about.

MR. ALLEN: And with the TBD-6001 going away, I can't see the point to it, so I'm going to add to --

MR. THURBER: Right.

DR. MAURO: Quite frankly, probably that's what you're going to do.

MR. ALLEN: I've got to go back to the source documents. So it will be revised

in the next revision.

CHAIRMAN ANDERSON: Okay. Again, Observation 3 is gone, because 6001 is gone.

MR. THURBER: Finding 6 again is, suggests that it would be better to do some modeling than to use some extrapolations.

MR. ALLEN: And it's almost the same answer as far as we had to revise the basis. We can't just point to TBD-6001.

MR. THURBER: Right.

DR. MAURO: Once you move up everything, you're taking it from the top.

MR. ALLEN: I guess not modeling -- make sure I get this right. Is this the beta?

DR. NETON: Shallow dose.

MR. ALLEN: Modeling beta dose is a little tricky with those programs, and those programs don't do so well sometimes. So the methodology will be revised. Whether it's relying on a measurement somewhere or a model --

MR. THURBER: I mean and you did have, again, in the Petition Evaluation Report, you had some new data which you used, and that's certainly an approach. I think if you can model it, the modeling would be preferred. But there's certainly alternatives available.

DR. MAURO: I'm putting myself in your shoes. In other words you start with Christifano & Harris, and TBD-6001, which is some kind of aggregating and sorting out and tabulating, to create a matrix from that.

And then of course you have your appendices. Then your appendices then go back to TBD-6001 to varying degrees. What you're doing is you're pulling this out now. So in my mind, good. Just get that out there, because that was kind of confusing and disorienting.

Now I -- now what you've just said I agree with completely. All right. Now I'm going to revisit, let's say some external

exposure to beta from some situation. You can do one of two things.

You can say I think I can model this and come up with a scenario that will be plausible and bounding, or I could go to Christifano & Harris, which is a very good source document, to see if they provide data on beta exposure or whatever their data show that can directly link, or do both.

(Simultaneous speaking.)

MR. ALLEN: I'm with you 100 percent on the internal.

DR. MAURO: Okay, but nothing on the external.

MR. ALLEN: No. As Bill pointed out, there's some data that's in ER that could be used, and the question is going to be using some surrogate data or using a model, you know.

DR. MAURO: Oh, okay.

DR. NETON: I mean the issue here is the dose rate coming off the slag, compared

to -- I mean because we've done this shallow dose for drums. It's got to be pretty low.

MR. THURBER: Yes. I'm sure it's very low. There's no doubt about that. If any coming out of a wooden barrel, if you will.

MR. ALLEN: Just being a small percentage of uranium and all that mag fluoride.

DR. MAURO: Yes.

MR. THURBER: I would doubt that there's any. But --

DR. NETON: Okay. We'll look at it.

DR. MAURO: These are easy fixes. You've got easy fixes.

MR. THURBER: Number seven, it just wasn't obvious how the inhalation intake of one picocurie per calendar day was calculated, we felt that the transparency of that process could be improved in the revised document.

MR. ALLEN: And I agree. I think the document just said we started with, or something to that effect, and more detail in the text.

MR. THURBER: Because we tried to reproduce it and couldn't. Eight.

(Laughter.)

CHAIRMAN ANDERSON: A lot of these you're going to get a revised document and we don't need to trash on it now. Once we get the text, then we'll see what you did and we could talk about it more then. So let's -- we've got the assignment made, so I'm ready to move --

(Simultaneous speaking.)

CHAIRMAN ANDERSON: Go ahead.

MR. THURBER: Eight deals with the issue that we talked a little bit about this morning, and we talked about many times in the past, and that's the appropriate resuspension factor to use, and as John indicated, we have been refining our thinking on this, and

clearly for a residual period where there's evidence of cleanup and that sort of thing, that 10 to the minus 6 is -- we would buy into it.

So again, some support for that selection in this revised document would be improvement.

CHAIRMAN ANDERSON: All we've done is double the length of your document.

MR. ALLEN: Well actually on that one, I was going to say this is more of a global issue. It's been discussed. Like you said, it's in every --

DR. NETON: But I'm thinking he's suggesting that if we could do it as a cleaner operation, then this might be valid.

MR. THURBER: Yes. I think it's in one sense it's global, but in another sense it's very site-specific, you know. We have evidence that there was a purchase order that included cleanup, you know, and therefore you've got something to document.

So it's both a global issue and a site-specific issue.

DR. MAURO: And the data are very solid, NRC work, the report they put out, where they come out with a 10 to the minus 6. They hammer it home cleanly. You know, when you've cleaned up your site, your residue, you're not going to have -- the resuspension is good.

DR. NETON: The amount of loose material is --

DR. MAURO: It's the loose material, yes.

DR. NETON: And if we can justify it based on the cleanliness of the operation, we'll do it. If not, it will become a global issue.

(Simultaneous speaking.)

MR. ALLEN: I'll tell you right now. I mean they were dumping drums outside. One report said they had respirators available but they didn't need them because

the wind blew it away. It's not a clean operation.

(Laughter.)

CHAIRMAN ANDERSON: All right there you go. A global issue.

MR. THURBER: Well, but there's also -- you know, this point is -- it's unclear as to how much of the operations were done inside as compared to outside, and I think in the Evaluation Report, it suggests that quite a bit of work was done outside.

But if you go back and look at one of the documents that was prepared at the time, I don't know that it was a contract completion report or something like that, it clearly indicated that most of the operations were in the building that was specifically built for the purpose. So --

MR. ALLEN: Oh, I agree. There was a little bit of conflicting information, but most of it seems to agree the vats and the filter purses, everything were in a specially-

constructed cinder block building, small building.

MR. THURBER: Right.

MR. ALLEN: But the dumping was --

MR. THURBER: That would be the sensible way to build that kind of a process. You have a hopper or something and the forklifts dump the stuff into a hopper, and it gets conveyed into the building through a bucket elevator or whatever.

MR. ALLEN: So I can take a stab at this for a site-specific issue, and then in the next Work Group we decide to push it into that global issue, if that's where we stand. If that's not right --

CHAIRMAN ANDERSON: If the site-specific issues don't meet these kind of criteria, 10 to the minus 6 and alternative strategies, you know, you'll present that. Okay. Nine.

MR. KATZ: Just as long as we're on that topic, what Work Group would handle

it? Procedures? Is it on the table for Procedures?

(Simultaneous speaking.)

DR. NETON: TIB-70 is where that value --

MR. KATZ: And we're working on that already. Okay.

DR. NETON: That's forever, for several years.

MR. KATZ: But it seems like then it should be, we should put it to bed there, because if we end up with a situation here where we decide it's a global, we're going to put it to bed because we have a petition. So it's a priority for -

DR. NETON: Yes, if this is a global issue, this would normally stay a TIB-70 issue being handled at the Working Group.

MR. ALLEN: The other end of that, Ted, is I think we reached agreement long ago there is a number that can be used. It's just a question of what that number, appropriate

number --

(Simultaneous speaking.)

MR. ALLEN: That's why the petition is not really an SEC issue.

MR. KATZ: It's a TBD issue, that's correct. Okay, thanks.

MR. THURBER: Finding 9, I think, is really closely tied in with 8, and I don't think it requires --

DR. NETON: With TIB-70.

CHAIRMAN ANDERSON: Connected.

MR. THURBER: It's definitely connected, and Finding 10, I believe yes. There's an error which is tied in with the same error that was in Finding -- whatever, 4, and it just got -- it gets extended into the residual period. So that's readily fixable.

MR. ALLEN: No disagreements, so --

CHAIRMAN ANDERSON: Any comments or questions from Board Members on the phone?

MEMBER FIELD: No, I'm good.

CHAIRMAN ANDERSON: Okay. The only thing that maybe we could talk about is the ER review. Do we anticipate that's going to come, and how soon are we ready with it? I just don't remember the timing on dealing with the petition versus this.

MR. ALLEN: I don't have a clue. I mean the ER is out.

CHAIRMAN ANDERSON: Yes.

MR. ALLEN: Were you guys tasking the ER?

CHAIRMAN ANDERSON: No, no. That's why I'm just saying, is that something we want to --

DR. NETON: Have we presented it yet?

MR. ALLEN: Yes, and --

DR. MAURO: Because I remember listening to it, yes. A while ago.

MR. ALLEN: In Niagara Falls. It was a while ago. We had to do it in Niagara Falls. It was just down the road.

MR. KATZ: Right.

MR. THURBER: We glanced at it briefly and made a couple of comments here that were very general and generic, but we have not reviewed them.

MR. KATZ: So we need to assign SC&A with sort of finishing the review --

CHAIRMAN ANDERSON: I think so, yes.

MR. KATZ: Or beginning the review.

(Simultaneous speaking.)

DR. NETON: Well, I assume if you've done a Site Profile Review, then --

MR. KATZ: You've got a lot of ground under your feet.

(Simultaneous speaking.)

MR. THURBER: But as we've said, there's quite a bit of new and interesting information in the ER that was not included.

DR. MAURO: Oh, okay.

DR. NETON: I was going to say,

because really just take what you have and see which ones are SEC issues.

MR. KATZ: So SC&A will review Hooker.

DR. MAURO: I mean think we just -- in fact, let's get a little focused more forwardly. This should be a focused review.

DR. NETON: Yes.

DR. MAURO: To zero in specifically on those issues that we've already covered, that we believe -- I may want to get -- but we believe are potential to the SECs. We will report back what we believe those are, just so everybody agrees.

DR. NETON: But as you build the statistics, there's additional information in the ER that might mitigate, for lack of a better word, some of these issues.

DR. MAURO: Okay. That's what I -- I think I heard that. I think, as always, I think I'd like to look at the petition, the way we did for --

MR. KATZ: You should look at the petition, absolutely. And that will be an extra piece? That certainly, because --

CHAIRMAN ANDERSON: We want to sort of roll the two together. We don't want to -- actually, that's something that's --

(Simultaneous speaking.)

DR. MAURO: I'm sorry. Maybe I crossed wires with the previous one, but is there some new data, new analysis going on with this? Is this the one that had some new data that you have --

DR. NETON: It's in the ER.

DR. MAURO: It's in the ER. It's in the ER. Okay. There's a previous one we had new data, but it's not in there yet.

MR. THURBER: They had some slag data from other sites --

(Simultaneous speaking.)

DR. MAURO: Okay, good.

CHAIRMAN ANDERSON: So that's a task. Otherwise, I think the rest of these

are going to be when you redo the profile.

DR. NETON: Right.

CHAIRMAN ANDERSON: And do we have a --

MR. ALLEN: There's some sort of White Paper for the surrogate data --

CHAIRMAN ANDERSON: Yes, right. Yes. I think that could be --

MR. ALLEN: And in all honesty, the rest of these are just no-brainers.

(Simultaneous speaking.)

CHAIRMAN ANDERSON: Well, it has to be done, and but --

MR. ALLEN: Yes, but I don't think there's going to be any disagreement on --

CHAIRMAN ANDERSON: No, no. It's a matter of finding the time to get it done, and so when --

MR. ALLEN: Finding the time is the issue.

(Simultaneous speaking.)

MR. KATZ: When is the time, Bill,

do you think it's required to do the Petition Evaluation piece for SC&A? That would probably take more time than Dave requires to button up what's been addressed here already.

MR. THURBER: A couple of months.

DR. MAURO: Two months is great. Two months would be very good.

MR. KATZ: Okay, okay, January.

MR. THURBER: Okay, because there's a lot of, you know, bad time.

(Simultaneous speaking.)

DR. MAURO: Do we have any interview data capture aspects to this?

MR. THURBER: We have not, we haven't explored any.

DR. MAURO: Usually -- well, you know what we'll do, is we will probably set that in motion, but nevertheless move --, and let the data capture interviews catch up.

MR. KATZ: It is a focus review, so I mean the interviews would only be if you see issues that you need to get from a few

interviews.

MR. THURBER: The one thing that's come up here that would be helpful, if we could get at it, is what was done indoors and what was done outdoors, and to what extent were -- how were things cleaned up?

DR. MAURO: And I'll tell you, my experience in all these SECs was it's not always self-evident that there would be great value to these, but it turns out every time we do them, great value occurs. We learn something, and if nothing else, the petitioners have a chance to, you know, communicate with us. How much of that turns out to really make it home? It's hard to say. But I really like the idea of going to those interviews.

MR. ALLEN: Just to make sure you're aware, and I know Bill's aware, this is about a four-man operation that ended in 1946.

DR. MAURO: That's a simple thing. Not too many people out there to talk to.

MR. ALLEN: And not many people, and there was two or three interviews done--

(Simultaneous speaking.)

MR. ALLEN: With some conflicting information. It's certainly worth looking at those. I think we found the one guy that might still be around that did it, one or two.

MR. THURBER: That's right. That's a very good point. A very good point.

MR. KATZ: So Dave, do you think that before the next Board meeting, which is February, do you think your part of this, in terms of having the petition discussion, could be done? The TBD issues, of course, don't have to all be put to bed, but --

MR. ALLEN: My thought is, I think I've got like two issues here that I could create some sort of like White Paper, and possibly if there's any question in how I'm changing the basis on these other things. But I think if there's any question, I can document them too, send this to the Work

Group.

Hopefully, about the time that you're completing the ER review, then we have one conversation, maybe put it all to bed, and then do a real revision on the Appendix after that.

MR. KATZ: Okay, so this is one that --

MR. ALLEN: Like I said, there might be a format revision done before that. I'm not sure.

CHAIRMAN ANDERSON: Any other issues with Hooker? Okay. Now we're just looking at an update on Baker-Perkins and what other sites are assigned to us?

DR. MAURO: Baker-Perkins is the last one. We did have DuPont Deep Water, but that we haven't acted on at all, for a variety of reasons. So the only left today to talk about, we did deliver relatively recently on Baker-Perkins, and I wonder if James East is on the line?

MR. EAST: Yes, he is.

DR. MAURO: And James, wonderful, thanks for hanging in there with us. James is the author of it, and aided us. What we really can do now is tell our story about what we found. I think you have the reports, but my guess is you probably didn't have much of an opportunity to look at the findings and the thought process. If not, you know, we could just give a summary to everyone of what's it all about.

MR. ALLEN: I've got to call it up and remind myself right now.

DR. MAURO: Yes, let's get a sense of it.

(Simultaneous speaking.)

DR. MAURO: So James, if you want to go ahead and just give, tell the story about the findings. Does everyone have a copy of the report? No.

MR. KATZ: Everyone received a copy.

DR. MAURO: Everyone received a copy. Well James, I'll just leave it to you just to go through the findings and set the context as best you can, and I'm going to leave. So I want to make my flight. So take care, and thank you very much everybody.

MR. KATZ: Thank you, John.

MS. GIRARDO: Is it okay if Hooker just signs off?

MR. KATZ: Yes, it's absolutely okay, and thank you for joining us.

MS. GIRARDO: Do I conclude from this that you still have work to do before you make your decision?

MR. KATZ: Yes, that's exactly right. So there will be another Work Group meeting, and we haven't determined yet whether it will be before mid-February or after that, like late February or March.

But there will be another Work Group meeting that you could listen into, and the folks from NIOSH will send you a notice of

that Work Group meeting date.

MS. GIRARDO: If I'm lucky. They didn't do it this time. Okay, thank you very much for all your time.

(Simultaneous speaking.)

MR. KATZ: Thank you.

MEMBER GRIFFON: Bye.

MR. ALLEN: One of them was anyway.

DR. NETON: I don't know if they were petitioners or not.

CHAIRMAN ANDERSON: I thought the lady speaking was the petitioner, but I might be wrong.

MR. THURBER: Baker-Perkins.

CHAIRMAN ANDERSON: Yes.

MR. THURBER: James, go ahead.

MR. KATZ: Well Dave, have you had a chance to pull up whatever information you have?

MR. ALLEN: Yes. I think I can discuss some of these issues on the surface.

I mean not deep, but it will probably knock out some of this.

MR. KATZ: Okay. Go ahead then James.

MR. EAST: Okay. In summary, Baker-Perkins was a manufacturer of equipment used for mixing, particularly in the baking industry and Fernald thought that their equipment might be useful in mixing uranium with water and ammonia mixtures.

There was a test done at a Baker-Perkins, over a five-day period, and we were fortunate in that there are data sheets for the air samples that were taken both before, during and after the tests. So we have some good airborne data for this test.

The one problem that we ran across, and this will come up in a finding, is that we were never able to identify which building and where in the multiple sites that Baker-Perkins did this building exist. It was referenced in one place as "Laboratory

Building 15," but the data capture never found a map that identified this and where it was located.

Going into the occupational medical dose, we looked at what Appendix P stated about the occupational dose, and it really just did not provide enough guidance to help the DR in determining what medical exposures would be expected.

So our finding is that it wasn't sufficiently prescriptive in just defining what the medical exposure would be. We drew the conclusion that one exposure, because it was a five-day period, one medical exposure for this would be appropriate and more than likely very favorable for the workers there. There was no data to support any evidence of medical exposure during this time.

If we look at Section 3, we are looking at the occupational internal dose, and we have guidance in Tables P-1 and P-2 that indicate the daily inhalation and ingestion

quantities for the workers. These are based upon the general area measurements and the breathing zone measurements that were made.

Those measurements are repeated in Table 1. It's on page eight of the report, and basically we have a pretty good idea of what was going on, well-documented additional notes.

One of the notes that we saw in there was that the workers were wearing dust masks and identified them as the half face cartridge respirators. However, we did not take credit for that protection in any of the internal dose calculations.

We looked, going down into page nine, we tried to unravel the background and how they came up with their numbers, and it seems that they took two steps to the right and two steps to the left, and really didn't define them too much, and ended up with what we think was pretty good numbers.

But we found the approach a little

not well-defined, and they throw in a factor of 73 in there that wasn't described as to what that meant. In a brilliant flash one night that woke me up, I realize that 73 is 365 divided by 5. So that's where the 73 came from, I imagine.

But they go in and take the concentrations that were measured. They take that and divide it out over the year, and then tell you to multiply by 73 to make it the year exposure again. I think this bouncing back and forth leads to confusion and difficult to understand what was really intended here.

I've performed the calculations to verify their data, and I see my inhalation data for plant for high has an extra factor in that first line. That W factor is extra and should be deleted from the equation. It doesn't belong there, so it's an error on my part.

But I went through the calculations, and I agree that the final

numbers in the end all work out, if you can figure out how the DR is supposed to use those. So that's -- we find that confusing and should be cleared up, and justification for this approach is lacking.

For Finding No. 2, the approach taken in the Appendix 2 exposure tables, of annualizing the dose from five days of exposure and presenting this data in terms of exposure per work days is confusing. It can lead to errors by the dose reconstructor. We go on to Finding No. 3. NIOSH --

CHAIRMAN ANDERSON: Wait, wait.

MR. KATZ: James, just before. Dave, do you want to respond to any of these as we go or --

MR. ALLEN: If you want me to. As far as Finding 1, it was the X-ray guidance, you know -- needed some better guidance to agree 100 percent. As far as Finding No. 2 with the annualized exposure for the five-day work, I agree 100 percent that that is

confusing.

I would like to point out and I did check, and every claimant that we've had so far have worked the entire year. So it didn't make a difference as far as too much confusion, but it could in the future. It is confusing and we will revise how that's presented --

CHAIRMAN ANDERSON: How many workers were at the site?

MR. ALLEN: We've had four claimants.

CHAIRMAN ANDERSON: This isn't a petition site though, is it?

MR. ALLEN: This is an appendix review.

CHAIRMAN ANDERSON: Yes, that's what I thought.

DR. NETON: We've already presented the petition and voted on it.

CHAIRMAN ANDERSON: Yes, I thought so.

MR. ALLEN: And I think back to you.

MR. KATZ: Okay. Thanks James. Go ahead, again.

MR. EAST: Okay. Finding No. 3, NIOSH should include guidance on how to reconstruct doses for employees not working in Building No. 15. We, as I pointed out, the building wasn't identified as to where it was in the site, and the two claims that I was able to look at, they had, they did not present any information to suggest that they had actually been a part of this experiment, and whether they were even in the building.

So by default, because we can't show them, show that they were elsewhere on one of the many sites in the area, this becomes very conservative to assume that they were in the room with the testing going on, where the air samples were taken.

MR. ALLEN: Yes. We don't have any information. We don't have any hope of

putting them in a particular building or not. The best we could do is divide it up into a types of jobs, so that at least an accountant or a secretary might not get the full brunt. That's about all we can do with what we've seen.

MR. KATZ: Okay, James.

MR. EAST: Okay. We're just looking at findings, so go down to Finding No. 4. That we're looking at the intakes are based upon half the breathing zone and half general area samples. Obviously, there's going to be some workers that were probably in there working this the whole time, and as a result, I don't see that as being a bounding exposure for workers like that.

It may be for supervisors and others, that we can't confirm were in the area. When someone is confirmed in the area, this will be more bounding of the dose.

MR. KATZ: Dave or Jim?

DR. NETON: I might have a

different recollection of this, but I thought that the Baker-Perkins workers were not even really in the area. The testing was done by the Fernald folks.

MR. ALLEN: They were certainly there.

DR. NETON: That was my recollection, was that the Baker-Perkins people were not participants in this test. They were there, but not doing the actual - I think the Fernald people came out, set it up, ran the process. We'll have to go back and look at that. But that was my -- I could be wrong, but that was what I recall. I don't know. We'll look at it.

MR. EAST: Okay. Going into external dose, it was based upon tables from Tables 7.1 of 6007, and as found in earlier reviews, this apparently contained some errors, and there is the traceability here, openness of where these numbers came from seems to be lacking.

So where our finding is that it contains errors, and it makes it difficult to trace information that is in Table P-3 to its source.

MR. ALLEN: On this one and the next one, why don't you go ahead and explain number six, and then I think I got the same answer on both.

MR. EAST: Okay. Finding No. 6, NIOSH should provide sufficient detail to permit the reader to duplicate the dose calculations in support of Tables 3 and 4. This is actually from previous reviews, I believe, of the TBD.

MR. ALLEN: Okay, and essentially this is similar to what we've already seen, I think, with United Nuclear and with Hooker, was we're revising the Appendix and eliminating TBD-6001.

So the Appendix will have to go back to the source documents, et cetera, and be a much more clear than just pointing to a

table that seems to have some errors in it.

MR. EAST: And then looking at residual contamination, there is documentation to show that there were, there was decontamination of the equipment, that took the equipment apart, cleaned it, measurements were being made of the air during this time period.

So and that the concept or knowledge that typically, uranium and this compound will be visible in values with the concerned contamination. So we agree that residual contamination would not be a source term for any of the workers, and there was no surrogate data used in this analysis, in this TBD. So that's my report.

MR. KATZ: Thank you, James.

CHAIRMAN ANDERSON: So it sounds like we have no real major issues here.

MR. ALLEN: Over the five days, I don't think you can.

CHAIRMAN ANDERSON: Yes. Well, I

was going to say, I mean but well, but we still want to, if we can move this forward and kind of get it done and off the table, it would be very --

MR. ALLEN: Yes. I think this one moves forward with the revisions to the Appendix.

CHAIRMAN ANDERSON: I mean this is one that by getting rid of 6001 created more work for you. But other than that, it's -- any questions on the phone?

MEMBER FIELD: None from me, Bill.

MR. KATZ: So Sam, do you want to just give us --

DR. GLOVER: This would be after the Board meeting comes.

MR. KATZ: After the next Board meeting.

DR. GLOVER: We're going to have a couple, several coming up as far as things that I have responsibility for, for SEC reviews, that would be preferable to --

CHAIRMAN ANDERSON: There's no real time constraint here.

MR. KATZ: Well, the only time constraint is we do have -- some of these are petitions that -- some of these are petitions, to the sense that we tried to get those in a timely way. So I think if we're shooting for end of February or early March. Is that what you're saying? Is that --

MR. ALLEN: That would be a much quieter time than trying to get things done right before a Board meeting.

MR. KATZ: Yes. Do people want to look at calendars or do you want to book this independently, as long as we have everybody here.

CHAIRMAN ANDERSON: Yes.

MR. KATZ: It's been easy to do it this way, and it's so hard by email.

CHAIRMAN ANDERSON: Yes, right. What dates are we looking for?

MR. KATZ: Yes. So let me just

run to that month quickly in my calendar and see. Okay. So the Board meeting is the week of the 21st. So then we're into March. So like the first or maybe right after the Board meeting is probably not the best time, because Sam will probably be at that Board meeting too.

CHAIRMAN ANDERSON: Right.

MR. KATZ: But what about the first full week in March, the week of the 7th? Does that seem reasonable for what you have ahead of you Sam? I mean because Dave we've talked. Dave has sort of checked these boxes for his. He's good with that, I think, right?

CHAIRMAN ANDERSON: Monday the 7th is good for me.

MR. ALLEN: What was the date you were talking maybe?

MR. KATZ: So the first full week in March for another, next Work Group meeting.

MR. ALLEN: I don't think I'm ready today to guarantee that I'll have

everything done I'm supposed to. But I'll definitely have some of it --

CHAIRMAN ANDERSON: The week of the 14th? Would one more week help?

MR. KATZ: One more week always will help.

MR. ALLEN: At this point, I don't think I can --

CHAIRMAN ANDERSON: You don't know, okay. I'm just looking at my schedule. That week is much better for me.

MR. KATZ: The week of the 14th?

CHAIRMAN ANDERSON: Yes.

MR. KATZ: Okay, and that gives them an extra week.

CHAIRMAN ANDERSON: It is not going to take all week.

MR. KATZ: So let's just pick a day, that week of the 14th.

CHAIRMAN ANDERSON: What works best for you?

MR. KATZ: Any of those days work

for me. Want to do it in the middle of the week, so no one has to travel on a weekend?

CHAIRMAN ANDERSON: Sure. Thursday?

MR. KATZ: So how is -- or yes, the Ides of March, March 15th?

CHAIRMAN ANDERSON: Tuesday? Tuesday the 15th?

MR. KATZ: Does that work for you, Bill, and you Mark, March 15th.

MEMBER FIELD: This is Bill. I teach on Mondays and Wednesdays, but I could --

MEMBER GRIFFON: Thursday is the 17th, isn't it?

DR. NETON: Tuesday we're talking about.

CHAIRMAN ANDERSON: Tuesday, March 15th.

MEMBER GRIFFON: Yes. Tuesday the 15th works.

CHAIRMAN ANDERSON: Okay.

MR. KATZ: And Bill, how about you?

MEMBER FIELD: I can make arrangements.

CHAIRMAN ANDERSON: Okay, done.

MR. KATZ: All right, and then is that it, Mr. Chairman?

CHAIRMAN ANDERSON: Yes.

MR. KATZ: We're adjourned. Thank you everyone on the phone for hanging in with us. Have a good evening, yes.

(Whereupon, at 2:13 p.m., the above-entitled matter went off the record.)