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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URANIUM REFINING AWE WORK GROUP

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MEETING

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MONDAY,
NOVEMBER 21, 2011

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

PRESENT:

HENRY ANDERSON, Chairman
R. WILLIAM FIELD, Member

ALSO PRESENT:

TED KATZ, Designated Federal Official
DAVID ALLEN, DCAS
TERRIE BARRIE*
HANS BEHLING, SC&A*
ANTOINETTE BONSIGNORE*
CLARISSA EATON*
MARY GIRARDO*
LARA HUGHES, DCAS*
JOSHUA KINMAN, DCAS Contractor*
JENNY LIN, HHS
JOHN MAURO, SC&A
JAMES NETON, DCAS
LAVON RUTHERFORD, DCAS
BILL THURBER, SC&A*

*Present via telephone

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

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

9:01 a.m.

MR. KATZ: All right. Well, let's get started.

Let me remind everyone on the line, except when you are addressing the group, would you please mute your phone? If you don't have a mute button, press *6. That will mute your phone. Press *6 again and it will unmute your phone. And please do not put the call on hold at any point, but hang up and dial back in, if you need to leave the call for a bit.

Much thanks.

And, Andy, it is your agenda.

CHAIRMAN ANDERSON: Yes.

First on our agenda is a continuation of the Hooker Electrochemical. For those on the line and others, you may recall at the last Board meeting we made a presentation on the SEC petition. And the evaluation by the Subcommittee, as reported

out to the Board, was a recommendation that a special cohort petition be denied, that it was feasible to reconstruct doses.

One of the major issues on the reconstruction of the doses was the use of surrogate data. There was some discussion at the Board meeting, and the overall Board tabled the motion to deny the petition and asked our Work Group to expand upon the surrogate air-sampling use by NIOSH. And we tasked SC&A to draft a memo detailing the approach that they had used and how the surrogate data was used and why this was feasible and an appropriate application of the Board's surrogate data criteria. That memo was sent around. I believe that was on the website, isn't it, as well?

MR. KATZ: Yes.

CHAIRMAN ANDERSON: That was completed September 22nd and posted then.

And then, there had been not enough time for the minutes from the previous

Subcommittee meeting to be posted so that the petitioners had adequate time to review and comment.

And so, we really have two issues on the agenda today. One is to have SC&A give a brief update on their draft memo, and then to respond to the emails that we got from the petitioners and respond to any other petitioner issues that they may wish to raise.

John?

DR. MAURO: Yes, Bill Thurber prepared a memo dated September 22nd, where he details explicitly the data that he compiled on the various sources, surrogate sources, and compares that data to the data that was used by NIOSH.

And I will turn it over to Bill to give the details. Hopefully, everyone has a copy of the September 22nd memo. That might be helpful.

But, Bill, could you take it from here?

MR. THURBER: Okay. In NIOSH's original document, they went through the available literature from sites that were performing similar operations to the operation at Hooker, which involved handling this so-called C2 slag. The sites included Electro Met, Mallinckrodt, and Fernald.

They determined, based on their review of a number of documents, that there were, as I recall, about 18 samples that they felt were appropriate surrogates to be used in calculating what the likely exposure was at Hooker. So, they took this cohort of samples, they calculated the 95th percentile value, and they came up with a number of 806 dpm per cubic meter, which is a key input parameter to estimating the internal exposures.

In our review of the Hooker data, we had a somewhat different take on what data was relevant and what data was not. Again, these are somewhat subjective technical judgments. And so, we were not necessarily

criticizing the dataset that NIOSH selected, but, rather, saying we have looked at the data and we think there are some additional samples that should be included.

And so, we came up with a dataset of 67 samples initially. From that dataset, we calculated that the 95th percentile was 555 Dpm per cubic meter, which was lower than the NIOSH number, and suggesting that the number that NIOSH had come up with was certainly claimant-favorable.

When the Board asked that this matter be reviewed back in September, we went back and looked through the data again and found a couple more pieces of information that we thought should be included. We determined on the basis of our revised dataset that the 95th percentile value was 759 Dpm per cubic meter as compared to the NIOSH value of 806 Dpm per cubic meter. We concluded that the 95th percentile wasn't terribly sensitive to what we characterized as reasonable, but

differing technical judgments in sample selection. So, we felt that the NIOSH value was appropriate.

And that kind of summarizes it. We did provide some arguments as to why we felt it was appropriate to include particular samples and not, but I won't belabor you with all those details unless you want to discuss them.

CHAIRMAN ANDERSON: Yes, I think one of the issues at the Board meeting was NIOSH's original use of a relatively small number of samples. I think your redo, as well as the first look, even if you expanded that to be 67 or more samples, as you say, the 95th percentile seemed to be relatively stable. So, I think that was very helpful and gives greater credence to the use of this surrogate data.

Bill, do you have any questions?

MEMBER FIELD: No. I think it was pretty clear. It looked like the impact of

using various samples is not that great.

CHAIRMAN ANDERSON: Yes. Anyone else have questions?

(No response.)

So, pretty much, as I understand it, we now have a better record and documentation as to the surrogate data available and its applicability to Hooker Electrochem. I think that has certainly at least increased my confidence in the use of that.

The other issue we have is the petitioners' issues. We got an email, and then I don't know if we want to respond to that first, if one of you, NIOSH, want to answer? A number of questions were raised. I think that we can answer them, but if you would maybe go through that? And then, we will ask the petitioners on the phone if they have additional questions.

MR. ALLEN: Okay. You want to go through --

CHAIRMAN ANDERSON: Yes.

MR. ALLEN: -- just one after another?

CHAIRMAN ANDERSON: Sure.

MR. ALLEN: Yes. This is an email from October 2nd, is that correct?

CHAIRMAN ANDERSON: Yes.

MR. ALLEN: Yes. And do you want me to read the petitioners' --

CHAIRMAN ANDERSON: Sure. It is relatively short.

MR. ALLEN: Okay. She bulletized this and numbered them 1 through 10.

On the first one, it was, "We, the petitioners, do not accept NIOSH's presentation which claims that there was not enough exposure of uranium to cause illness and death."

In response, we would just like to say that is not NIOSH's position.

CHAIRMAN ANDERSON: Yes.

MR. ALLEN: Our position has been

that the dose can be estimated, not whether it is high or low.

And the second one, it is, "We, the petitioners, do not accept SC&A's participation in the presentation. We are convinced by the matter in which this was" -- or, I'm sorry -- "We are convinced by the manner in which this was handled that none of those tasks had their hearts in what they were doing. This is no way to do an independent study.

"True research would demand that any new research being done would start from scratch and turn a blind eye and a deaf ear to all that NIOSH (Allen) had done in favor of their own study. Once accomplished, then the two would be compared showing differences and similarities. This was not done. Instead, SC&A kept saying that they were not told to do this or that. This shows that they simply went through the motions and the Work Group fell in line."

I don't know if it is best for NIOSH to respond to this one or not, but, I mean, that is essentially what they said. SC&A was not tasked to do that. And primarily, I think the law itself basically says that we will evaluate petitions and the Advisory Board will review those evaluations and make a recommendation to the Secretary. And this is all part of that process. I don't think there is anything anywhere that mentions or even suggests an independent study.

MR. KATZ: I mean, I would just add to that, SC&A was tasked with evaluating NIOSH's petition evaluation, reviewing it independently and coming to its own conclusions, as it does for many, many, many petitions that the Board considers. And SC&A conducted that work independently and brought its conclusions to the table, and those conclusions are a matter of record in the transcripts as well as in the SC&A reports.

Jim?

DR. NETON: I just have a quick question. I am a little confused as to which document Dave is working from because I have an October 2nd email that is very different from that one.

CHAIRMAN ANDERSON: Yes, I do too.

DR. NETON: Which --

MR. ALLEN: Maybe I have got the wrong one here.

DR. NETON: I mean, I think you have answered some that need to be addressed --

MR. ALLEN: Yes.

DR. NETON: -- but not the ones I thought were going to be discussed.

MR. ALLEN: This one had a title on it. It was from the petitioner. This has the title, "Response to Work Group denial of SEC petition for all workers in all locations of Hooker Chemical."

DR. NETON: What is the date on it?

MR. ALLEN: This was submitted to the Advisory Board August 24th, 2011. So, I have got the wrong one here.

DR. NETON: Well, there is another one here.

CHAIRMAN ANDERSON: Yes.

MR. ALLEN: I'm sorry. Let me find the right one.

DR. NETON: Yes, the one I have was actually sent to Josh.

CHAIRMAN ANDERSON: Yes, by Mary.

DR. NETON: Yes.

MR. ALLEN: Okay, I have got that one here.

MR. KATZ: Okay.

MR. ALLEN: I'm sorry.

CHAIRMAN ANDERSON: Well, I think we addressed some of those points before. But the petitioners are on. If they want us to respond, I mean, to your 10 points, we could do that.

MR. ALLEN: We can do them all.

CHAIRMAN ANDERSON: Yes.

MR. ALLEN: Sure.

CHAIRMAN ANDERSON: But that isn't what I had here.

MR. ALLEN: Okay. My fault. I'm sorry. I had the wrong one here.

CHAIRMAN ANDERSON: Yes.

MR. ALLEN: The October 2nd email, it is an email to Josh Kinman. He is our SC&A or SEC -- what do we call him?

MR. KATZ: Petition counselor.

MR. ALLEN: Petition counselor, yes.

Do you want me to read the email here? It is an email that points to a couple of different links. I can read it because it is short.

CHAIRMAN ANDERSON: Yes. That's why I said, "Read it."

(Laughter.)

Then, when you started this other one, I thought that sounded like an earlier

one that was quite a bit longer.

MR. ALLEN: Okay. This email says, "Hi, Josh. I would like some answers. Found the following links which showed that there is a possibility that Hooker employees were exposed to other harmful substances in addition to uranium.

"Hooker was involved in the cleanup of a storage dump in suburbs close by here." And this was coming from near Niagara Falls. "The University of Rochester used this area as a burial waste material" -- "for burial of waste material." Sorry.

"Since this SEC includes all workers in all Hooker locations, this part of its history must also be included for consideration. NIOSH is using surrogate data from Mallinckrodt because supposedly Mallinckrodt performed a similar process. However, Mallinckrodt also had thorium exposure. Since Mallinckrodt had thorium exposure and performed the same operation as

Hooker, it is reasonable to assume that the workers at Hooker would have been exposed to thorium.

"Was Hooker responsible for thorium waste listed in the report?"

And then it says, "The first link is as follows," and it provides a web address.

And then it goes on to say, "In this link above, Hooker is mentioned all over the place and, in addition to thorium, the exposure to cesium, strontium, and a host of other radionuclides are considered."

"Secondly, it goes to the Advisory Board approval of SEC for Lake Ontario Ordnance Works located in a suburb close to here. The reason for the approval was that there was no record and dose reconstruction could not be done."

And then, it provides another web address.

Then it goes on to say, "Please advise me if this new information can be

included in a discussion of Hooker Electrochemical by the Advisory Board Work Group and SC&A.

"I would appreciate it if you would forward this email to NIOSH, the Work Group, and SC&A. Since the Advisory Board has already considered the Work Group's denial of the SEC petition, it would also be appreciated if they were advised of this new information.

"Thanks for your assistance."

I don't know if I can say the name or not.

That's it for the email.

I have looked through the two links in this email and read through this, and I think there is some confusion that there was a -- I'm not sure of the first burial site that she is talking about. Hooker was involved with two distinct burial sites. One was Love Canal. And through searching, we have never found any information that any radionuclides were buried at Love Canal.

Plenty of chemicals, but we haven't found any radionuclides associated with Hooker or anybody.

The other burial site in that vicinity that Hooker was associated with was Lake Ontario Ordnance Works, and Hooker was actually the prime contractor for some period of time there at Lake Ontario Ordnance Works. Under EEOICPA that is a separate site and, as she mentions in the email here, that was made a Special Exposure Cohort for all the different radionuclides buried there with no dosimetry data and not a lot of information as to exactly what was there and how much and how it was contained, et cetera.

I didn't see anything in these links that pointed towards the Hooker chemical plant in Niagara Falls itself, the one that we are interested in.

Perhaps petitioner is on the phone; maybe she can point us to that or describe what she is looking at here.

But it also says, it started off with something about exposure to other harmful substances in addition to uranium. She goes on to mention strontium, et cetera. I don't know if she is completely talking about other radionuclides or she is talking about other chemicals.

Right now, this program, at least the NIOSH part of this program does not handle the chemical exposures. It is purely radiation dose reconstruction. So, I didn't dig into the chemical exposures in any of these documents. It is outside of our authority.

CHAIRMAN ANDERSON: And the thorium issue? I mean, the use of surrogate data is really used for specific activities in handling --

MR. ALLEN: Yes.

CHAIRMAN ANDERSON: -- rather than the overall facility, which at Mallinckrodt was somewhat different than --

MR. ALLEN: Right. At Hooker Electrochemical, they were essentially shoveling or unloading drums of mag fluoride and digesting it and redrumming the concentrate after they had dissolved it. And we used that type of work at Mallinckrodt, but there were many other things they did at Mallinckrodt we didn't use.

Any questions?

CHAIRMAN ANDERSON: Not from me.

MR. KATZ: Why don't we see, if no one here has questions, why don't we see if the petitioners have questions --

CHAIRMAN ANDERSON: Sure.

MR. KATZ: -- about what they just heard from Dave?

CHAIRMAN ANDERSON: Okay, it is open to those of you on the phone, if you have questions or comments.

MS. GIRARDO: Hello.

CHAIRMAN ANDERSON: Yes, we hear you.

MS. GIRARDO: I am curious if you read the article.

MR. ALLEN: Yes, we did.

MS. GIRARDO: Yes, you read the article, and you still don't see that there is a connection to Hooker?

MR. ALLEN: There is mention of Hooker in burial, but primarily it was talking about Lake Ontario Ordnance Works. It was talking some about the chemical burials in Love Canal.

MS. GIRARDO: I know, but it was Hooker employees who were the cleanup crew.

MR. ALLEN: Yes, at Lake Ontario Ordnance Works. That is a covered --

MS. GIRARDO: No, but the petition specifies the workers in all locations.

MR. ALLEN: Yes, but --

MS. GIRARDO: So, you can call it a technicality if you want, but this does prove that they were in that location. They were Hooker employees. They were getting paid

from Hooker.

MR. ALLEN: And --

MS. GIRARDO: So, just to discount them and say that that was Ordnance, that doesn't make sense.

MR. ALLEN: Well, it wouldn't make sense if we were to just discount them, but we are not. If they were working at Lake Ontario Ordnance Works, then DOL can verify their employment at Lake Ontario Ordnance Works. It is already -- whether they were working for Hooker or somebody else -- it is already a Special Exposure Cohort. So, they are already covered under that.

And we are not allowed to combine sites into one petition. We have to have these separated. Lake Ontario Ordnance Works has already been settled quite a while back, and this is for the Hooker chemical plant on Buffalo Avenue.

MS. GIRARDO: Oh, man. It still doesn't make any sense.

MR. KATZ: So, Mary --

MS. GIRARDO: If they are Hooker people and they are working at a location and getting paid by Hooker, then they should be all part of the same complex.

MR. KATZ: Mary, Mary, what Dave is trying to tell you -- this is Ted Katz -- is that those people you are concerned about are covered. In fact, they are part of an SEC Class already, and were they to apply, make claims to the Department of Labor, they would be categorized as covered by that Class and they would be compensated if they meet the conditions for being covered by that Class.

So, those people you are concerned about, they are covered already. They are not losing out here. They are already covered by an SEC Class.

MS. GIRARDO: Divide and conquer.

I would like to request that, since I have been having difficulty getting a response from Freedom of Information regarding

emails -- it has been three months now -- that no decision be given to the Advisory Board at this point, until that is cleared up.

MR. KATZ: Well, the Advisory Board had this on the agenda for December. This Work Group will report out to the Advisory Board. And certainly, we can notify the Advisory Board that you have a Freedom of Information request in and that it is your desire that the Advisory Board not take action until you have responses to that. We can certainly make the Advisory Board aware of that.

MS. GIRARDO: Okay.

MR. KATZ: Okay?

MS. GIRARDO: And I am not understanding this information on the 95th percentile where it is favorable to the claimant. What do you mean by "favorable to the claimant?"

MR. ALLEN: I think that was Bill's report, but favorable to the claimant

just meant -- and Bill can correct me if I am wrong -- he pulled up the data and added some additional air samples, eliminated some others, using a slightly different professional judgment, and found that the numbers are fairly similar, that he ended up with this new dataset, but they were actually a little bit lower than what we used in the TBD. And by lower, he said that the TBD was claimant-favorable since it gave a slightly higher number.

MS. GIRARDO: When you say "claimant-favorable," do you mean for dose reconstruction or for SEC?

MR. ALLEN: For dose reconstruction.

MS. GIRARDO: I think the needle is stuck. Okay. All right.

MR. KATZ: Let me just ask NIOSH, for when we have the Board meeting, could you just update the Board when Hooker comes up on the status of the FOIA, just so that they know

when it was received and where it is in the process, and a sense of what the FOIA covers, too, so that they understand what information is being sought that the petitioner hasn't received?

DR. NETON: This is Jim Neton.

I will take that on.

MR. KATZ: Thank you, Jim.

DR. MAURO: Mary, this is John Mauro.

When we review NIOSH's strategy for surrogate data and the use of data, whether it is on the real site with real measurements or it is surrogate data from other sites, one of our greatest concerns always has been, when you use that -- let's say it is air-sampling data, dust loading data. And you're saying, well, we're going to assign some person exposure to a certain level of airborne radioactivity. Our concern always has been that, when there is any uncertainty as to what level a person might have

experienced, we like to see them assigned the high-end value. That is, we don't want to assume they are exposed to the typical value. It is possible that he had a job that put him in a place where he experienced high-end values.

And the 95th percentile simply means that they are really taking the highest of the various values that were observed and they are assuming that that person was exposed to that high level day-in and day-out every day, which we consider to be quite a bounding analysis. In other words, we are really giving the claimant the benefit of the doubt and assigning an exposure that is at the high end of the distribution.

So, SC&A is very comfortable with that strategy when you have the data. Now SEC issues arise when you don't have the data. As you probably heard from around the table, we are in the world of surrogate data, and the Board is very, very concerned that when you do

use surrogate data, data from another site, that you do it very carefully.

So, we were tasked to look very carefully at both.

MS. GIRARDO: Well, I don't deny that you were very careful, but the use of these three companies that you have got, the rule of three, these people are all over the place as far as location.

And Mallinckrodt is so far away. I don't understand where the basis comes for using these companies, how you determine which companies you are going to use. Do you just draw them out of a hat? Or do you go all over the country to find somebody?

All of these examples that were used were the rule of three, and they had to be within a certain location and within the same state. That was the farthest that they went. They didn't go into Missouri.

I mean, how can you use Mallinckrodt on that basis? What is the rule

for surrogate data? How do you determine which companies you are going to use? Is it the rule of three? And if one is only good, what happens to the other two? Fernald is still not kosher. Electro Met, you're still deciding that today.

I just don't understand how you operate. I mean, how can you pick these companies out and then base Hooker with these companies when Hooker did not have any records whatsoever, and you're picking it out from the air? I know you are very scientific people. I know you are educated. I don't doubt all that.

But the point is, what is the rule? Is it the rule of three?

MR. KATZ: Mary?

MS. GIRARDO: If it is the rule of three, you don't have three.

MR. KATZ: Mary, Mary?

MS. GIRARDO: Yes?

MR. KATZ: Folks are trying to

respond to you, if you will give them a chance.

DR. NETON: Ms. Girardo, this is Jim Neton.

The rationale behind how we apply surrogate data has been described in an Implementation Guide that we wrote some time ago. I think it is IG-004, yes.

And the Board also has our own criteria, but at the end of the day, both the Board's and NIOSH's guidance are very similar. They are very prescriptive in the sense that we have to have data from a similar operation. In this particular case, it is the dumping of drums of uranium during a similar time period, which in this case these are contemporaneous, in a similar operation, I mean with ventilation and everything like that considered. So, they are prescribed. I would encourage you -- it is out there on our website -- to read the Implementation Guide.

But I am confused as to what you

mean by this rule of three. I don't know where that is coming from.

MS. GIRARDO: Why do you have these three companies? Why not six? Why not seven? Why not one? Why not three? I mean, I don't understand. It's called the rule of three.

DR. NETON: Well, there is no --

MS. GIRARDO: I'm sorry. I'm sorry, but if you have these companies that are still up for grabs here, and you are only basing it on Mallinckrodt, then you don't have three companies. So, which is it? Must you have only one? Must you have three? I am saying if it is the rule of three, you only have one because you can't point out the other two.

DR. NETON: I'm sorry, but there is no rule of three. If you look at the Implementation Guide, one needs to find a facility that is very close in its operation to what we are trying to use the data --

MS. GIRARDO: I'm sorry, I disagree. That is not what it says. They used the thing about the railroad, the mines, all this stuff, and that wasn't what they said. It had to be, the farthest they could go was within the same state; they couldn't go out of the state. And you've gone all over the place with these things.

DR. NETON: I'm not familiar with what document you are talking about. If you can cite it, maybe we could --

MS. GIRARDO: Well, it is surrogate data. It is the stuff that was supplied to me. I found it on my own and it was supplied to me by your NIOSH people.

DR. NETON: Do you know the name though?

MS. GIRARDO: You check it out. It is called the rule of three.

DR. NETON: Well, I wrote the Implementation Guide.

MS. GIRARDO: What I want to know

is, why do you have three people, three companies, and two of them haven't even been decided on yet? How can you judge Hooker on material that hasn't even been evaluated yet; no decision has been made?

So, I'm sorry, I'm going to cut out of this because I don't want to get a heart attack.

Thank you very much.

CHAIRMAN ANDERSON: Are there other petitioners on that have questions or would like to make comments?

MS. BARRIE: This is Terrie Barrie.

Am I allowed to ask a question?

CHAIRMAN ANDERSON: Yes.

MR. KATZ: Yes, of course.

MS. BARRIE: Okay. Has thorium presence at this site been absolutely ruled out, that there was no exposure?

MR. ALLEN: We have found no evidence that they ever worked with thorium.

We have the contract for what they did do, and it was contaminated magnesium fluoride for about, if I remember right, an 18-month period when they were trying to concentrate it with some waste hydrochloric acid they had from another process.

So, they essentially took the mag fluoride, dissolved what they could of the magnesium fluoride, thus, concentrating the uranium slightly. And then, they packaged that up and shipped it back off.

MS. BARRIE: So, thorium wasn't involved with this place at all?

MR. ALLEN: Definitely not with that operation, and we haven't found any other operation with the Atomic Energy Commission or MED.

MS. BARRIE: Okay. And the other thing, I want to follow up with what Mary said. I do have a concern about using Electro Met and Fernald data because what Mary said was that data has not been signed off by the

Work Group as being valid.

So, I would consider, I question the use of that data until, well, your Work Group and Fernald's Work Group has made a decision on the SEC petition.

And that is all I really have to say, and thank you for allowing me to talk.

MR. ALLEN: Well, in response to that, the mag fluoride at Electro Met and at Fernald and even at Mallinckrodt were very small operations compared to what they did on the site, and the exposures are much smaller than handling pure uranium compounds. This was a uranium-contaminated mag fluoride. It had about .2 percent uranium in it.

So, all we really have to do is look at those particular operations. In this case, it was just handling of this stuff, emptying drums, filling drums, shoveling stuff, et cetera. And I don't think that the Work Groups on those sites are actually looking at those operations as something they

cannot estimate the dose for. They are looking at the bigger picture on those sites and uranium bioassay, et cetera, that covers everything, of which this would be a very tiny amount of what the uranium intakes they would get at those sites.

MS. BARRIE: Okay, I understand that, but can you guarantee that the data that you are using from these two sites is accurate?

MR. ALLEN: I don't know about guarantee, but the comments that Mary made were actually that these are different sites, over a course of several years, similar material, and they are all coming up with roughly the same airborne activity, kind of it is almost like a QA on their programs and on their samples, that they are all relatively similar, even though it is different people, different sites, different operations all handling this type of material.

CHAIRMAN ANDERSON: Is the Fernald

committee going to meet before --

MR. KATZ: No.

CHAIRMAN ANDERSON: No? Because one thing would be to query them. I mean, we have heard about the reliability of the Fernald data. At least indirectly we have been told that these particular samples and these activities are not the type that are potentially questioned.

And it would be helpful if the Committee actually could respond and say this particular set of surrogate data that we are using from Fernald are not the types of samples that they are questioning. I think it was mostly the biomonitoring that they were concerned about, wasn't it?

MR. ALLEN: No, I think it was the air sampling. They never addressed it much in that Work Group because there was so much uranium bioassay that the air samples were irrelevant.

CHAIRMAN ANDERSON: Were

irrelevant.

MR. ALLEN: They weren't really taking that.

CHAIRMAN ANDERSON: So, you have looked at the reliability of that and --

MR. ALLEN: Yes, we looked at what the allegation was --

CHAIRMAN ANDERSON: Yes.

MR. ALLEN: -- where it came from, et cetera.

CHAIRMAN ANDERSON: Yes.

MR. ALLEN: And it was actually an affidavit from a particular guy at Fernald that took air samples, and he said he was required by his boss to go back and redo a sample that came out high, he remembers on one occasion, and it was with the F-machines, which was plant 5.

CHAIRMAN ANDERSON: Yes.

MR. ALLEN: These air samples here were taken at plant 8 that we dealt with. That guy, the allegation was one time, and it was

green salt, plant 5.

DR. NETON: But it was a much later time period.

MR. RUTHERFORD: Yes, a later time period.

MR. ALLEN: Well, the affidavit didn't actually have any time period on it.

DR. NETON: It wasn't in the fifties.

MR. ALLEN: Well, this guy worked there in the fifties on into the seventies. So, I don't know the timeframe. That particular document didn't mention what the timeframe was that it had, but definitely wasn't a similar situation.

And like I said, the air samples are very similar to what they are getting in different states and different companies with this material. For the dataset that is used for the appendix, if you simply remove the Fernald data and analyze what is left, the numbers actually go down. It is virtually the

same number, but it is a slight decrease.

CHAIRMAN ANDERSON: Okay.

MR. KATZ: I think it is useful for either the Work Group or NIOSH to report out on that too.

CHAIRMAN ANDERSON: Yes. Yes.

MR. KATZ: That was a question.

CHAIRMAN ANDERSON: Yes, we will include that, yes. So, the whole Board can decide whether they want to put this on hold, yes.

DR. NETON: Well, a lot of this may have to do with the FOIA request status.

CHAIRMAN ANDERSON: Yes. Exactly.

DR. NETON: But it is good to get this on the table at the same time.

CHAIRMAN ANDERSON: Yes, yes.

MS. BARRIE: Thank you.

CHAIRMAN ANDERSON: Thank you.

Yes, we haven't resolved it here, but we will discuss it further.

MS. BARRIE: I appreciate it.

Thank you.

CHAIRMAN ANDERSON: Yes.

Any other comments, questions? Feel free to speak up. You don't even have to identify yourself. We want to get all of the questions because I will carry these forward to the full Board since our Committee is only three individuals.

(No response.)

MR. KATZ: Any other questions from Bill Field?

MEMBER FIELD: No, I'm good. Thanks, Ted.

MR. KATZ: Thank you, Bill.

CHAIRMAN ANDERSON: So, I think, again, Bill, I don't know if you have heard anything here that would change your view on the petition, but at this point I think we now have further documentation on use of the surrogate data, which I think actually strengthens this as an example of how one can use surrogate data.

At least in my mind, I am still comfortable with going back to the Board with our recommendation of denial of this portion of the Hooker site. Are you in agreement with that?

MEMBER FIELD: Yes, Andy, I am in agreement. It sounds like there's just a few issues that need to be clarified.

CHAIRMAN ANDERSON: Yes.

MEMBER FIELD: I am in total agreement with you.

CHAIRMAN ANDERSON: Okay. Thank you.

So, next up is Electro Metallurgical, and there has been a reassessment of that site. We got an email about that.

DR. NETON: Yes, Jim Neton.

I think everyone has probably seen the email that was distributed --

CHAIRMAN ANDERSON: Yes.

DR. NETON: -- I think it was

November 16th.

CHAIRMAN ANDERSON: Yes.

DR. NETON: But we have sort of a rationale behind our reassessment of the Electro Metallurgical facility. It is a covered site from 1942 to 1952, I believe, that timeframe, 1953.

And originally, our position was that we could reconstruct the internal exposures for all years for that facility. It was primarily based on our use of some fairly abundant air sample data that was taken after 1947, I believe around the 1948 timeframe.

Even though we did have bioassay in the earlier time period, it was somewhat limited. We didn't have job titles associated with any of those bioassays. So, we were, by and large, relying on a backwards extrapolation from the 1948 timeframe, the earlier years.

Part of the rationale, of course, was that the processes would be similar. In

our subsequent review of documentation that we obtained, it became clear that in 1947 there was a health and safety assessment facility and various improvements were made in the processes. Presumably, they would lower exposure. So, we could no longer rely on the post-1947 data to back-extrapolate in those time periods.

That is where it left us. So, at this point, we are proposing that a Class be added from 1942 to 1947. We still can reconstruct doses from 1948 until the 1952 timeframe.

So, at this point, we will be revising the Evaluation Report for Electro Met.

Are we going to have this ready for the next Board meeting? I don't recall that --

MR. RUTHERFORD: No.

DR. NETON: No, we won't have this ready for the next Board meeting, but as soon

as we can, we will have --

CHAIRMAN ANDERSON: Yes.

DR. NETON: -- a revision put out. At that point, it will to be presented to the Board --

CHAIRMAN ANDERSON: Yes, yes.

DR. NETON: -- with our recommendations. So, that is where we are with Electro Met.

CHAIRMAN ANDERSON: Are there any, Bill, do you have any questions?

I think we will wait to see your presentation, but it is good to have this update. We will certainly not do anything further here until we get what that is.

Bill, do you have any questions?

MEMBER FIELD: No, I agree with your thinking, Andy.

CHAIRMAN ANDERSON: Oh, okay.

MR. KATZ: Do we have any Electro Met petitioners on the line?

(No response.)

Okay. If we do have any Electro Met petitioners, and you have any questions about this, this is a good time to ask.

CHAIRMAN ANDERSON: Just as far as, for those of you who are, for a timeframe this won't be on the agenda at the meeting in Tampa in December.

So, the earliest would be February.

DR. NETON: There will be an update.

CHAIRMAN ANDERSON: Yes. Yes, right, just an FYI, an informational update.

MR. KATZ: Okay.

CHAIRMAN ANDERSON: Okay. Next is United Nuclear, and we have a number of White Papers that have been developed on this.

Take it away.

MR. RUTHERFORD: This is LaVon Rutherford.

I'll start with the air-concentration data for 1961 and 1962. This

issue was brought up, the concern that we extrapolated -- we had bioassay data post-1962 and we had bioassay data pre-1961. We developed a distribution, and we extrapolated back through 1961 and 1962.

The question that was brought up was whether the air-concentration data really supported what we were doing, extrapolating through that period. So, what we did was we went back and we looked at the air concentration. We actually went back and we took the data and looked at the available data in 1961. We found there were 310 samples taken during that period.

We looked at locations that they were taken, the red room, green room, blue room, item 1 plant, pellet plant, laundry area, warehouse area, the blender room, the guard station, and the office area. So, we looked at all those locations to ensure that we were covering a broad scheme with the air sample data.

We looked at various studies that were done, integrated dust exposures for workers for that period. We looked at actual dust studies done at the pellet plant. We went through all of those.

Actually, if you have the report in front of you, you can go through this as well. Table 1 actually identifies air sample data points for each location, and it identifies the number of data points that we had.

The red room was called out specifically because it was the workers that worked in the red room were the workers who were identified as potentially having high exposures, and that caused the reinstitution of the bioassay program in 1962. So, we looked at the number of points that we had there. We had quite a few air data points in the red room.

We also had the green room. You can see the data points all the way through

each one of those stations.

So, we wanted to make sure that we had adequate data points for each of those locations where we had the higher concentrations.

Then, we looked to see if the air sample data correlated with the plant activities. Again, the red room was chosen as a potentially high area because it was the one where the individuals were noted to have contaminated themselves, and we had high urine bioassay samples from those individuals, once the bioassay program was reinstituted.

Again, if you go through the report, Table 2 actually has locations and air-concentration values. These are actually sample points that were above. There was an administrative control level of 110 Dpm per cubic meter for low enrichments, and for high enrichments it was 220 Dpm per cubic meter.

These are actually sample points and concentrations for areas that were above

that administrative control level. You can see that, if you went through, the red room actually makes up about 27 percent of the exposures that are above the ACL that they were using. However, there are some high concentrations in the blue room as well, if you look through that.

Then, we took those and we actually looked at, we developed a geometric -- we actually did a distribution on those. The entire dataset had a geometric mean of 20.3 Dpm per cubic meter with a GSD of 4.8. The red room by itself had a geometric mean of 32.2 Dpm per cubic meter with a GSD of 3.4.

And there was also, as I mentioned, integrated air data, worker exposure air data. We did a geometric mean on that of 35.8 Dpm per cubic meter, which kind of correlates well with the red room, with the low GSD.

And then, ultimately, if you come

back onto Table 3 in the back, we actually did a comparison of the data points, the geometric means, the 95th percentile, and then to the intake numbers that we have identified in TBD -- it is on TBD now. It is not 6001.

But if you look at the 95th percentile air data for all locations, the red room and the worker data, and then you compare those intakes to the intakes that we have in 6001, which are derived based on the bioassay data, it fits right in between the Type M and the Type S. But if you assumed it was Type S, it would be much less; the 95th percentile of the air data is much less than the Type S. If Type M, the air data is a little bit above that. So, you can see that, anyway, by looking at that.

Also, something we sent out late in the game is a graph that we put together. We wanted to actually take and compare the intakes. We wanted to graphically show this. Instead of just putting it down in numbers, we

wanted to graph out the air data we had from 1960, which is when we still had -- or bioassay data stopped at the end of 1960. So, we wanted to include 1960 in this and then go through the period when we have no bioassay and then include the first year when we get bioassay again in 1963, late 1962/early 1963 period.

And so, we graph that out. If you look at that graph, you will see we have the Type S geometric mean bioassay line and then we have the Type M as well. You can see how the air data for the most part runs right along the line with the Type M and actually mostly is below -- there are some data points above the Type S, but not many.

And really, actually, in 1963, the actual numbers of air sample data points we have significantly increased because when they recognized they had that concern with higher intakes than what they had thought they were getting, they actually increased the amount of

air sampling further in 1963. So, we have a lot more data points in 1963. That is why you see that.

All right, that's about it. Do you want to add anything to it, Jim?

MR. KATZ: Dave?

DR. MAURO: Yes, we had a chance to look this over on the weekend. Hans Behling and I both looked at it.

What we see are some problems. Ultimately, when you say, so what are we looking at, well, we have got these couple of years where we don't have bioassay data, the argument being made that, well, but we have got lots of bioassay before and afterwards, and we have air-sampling data that is continuous across.

And the process you went through is to look at the air-sampling data. At the back-end of the process, you conclude that the geometric mean of the air-sampling data with a standard deviation of 5 is probably a good way

to assign.

Hans took a fairly close look at it. Quite frankly, his original look at it goes back to 2009, the report.

And I would like to turn it over to Hans, and he could explain some of the reasons why he has some concerns with this.

Hans, are you available?

MR. KATZ: You may be on mute, Hans, *6 if you are on mute to come off mute.

DR. BEHLING: Okay, you're right, I was on mute.

Just to give you an overview, we agree pretty much with what you stated in your summary as well as in your White Paper regarding the issue of what data is most claimant-favorable.

As I pointed out in my original review of the United Nuclear facility -- and this goes back to September 2009, so it is more than two years old -- I identified the fact that, in comparing the air-sampling data

with bioassay data, there was in many instances very, very poor correlation. So, I do agree with the need to look at the bioassay data urinalysis as a way of trying to fill in the gaps.

But among the things that we had previously discussed was, if there is bioassay data available, that should be used because oftentimes that may very well be empirical data for a given individual, may supersede the values that were provided as part of the cohort model in Table D-1.

One of the things that I had done in assessing the usefulness of that data was to actually go back and identify among some of the workers what their exposure was in terms of their urinalysis data and then compare that to what the cohort model would predict would be a usable number if you didn't have the data for them.

And in my initial write up, I looked at two particular individuals. For

those who may have access to the original write up that, as I said, goes back to September 2009, I had identified two individuals who were operators and they were identified not by name, but by code. The first operator was AAA and the other one is BBB; in other words, A-A-A and B-B-B.

I looked at the actual data that was available in their behalf that included bioassay data, urinalysis data, before the two timeframes or before the timeframe of June 1963 and after June 1963. If you look at, if you have access to that report, under Table 3, there was a large number of bioassay data available for both time periods.

And so, what I did was I used their actual empirical bioassay data, and using IMBA, I calculated what would have been the expected inhalation data for those two individuals for the two timeframes, prior to June 1963 and post-June 1963, and then compared the actual values that I generated

from IMBA and compared that to the recommended values that are identified in Table D-1. And I came up with the following:

Again, those numbers were summarized in Table 3 of my report. Actually, no, I'm sorry, not Table 3, Table 4.

In Table 4, the recommended daily inhalation dose based on the cohort model that NIOSH generated, the inhalation for an operator would have been 12,590 Dpm per day. If I actually used the empirical urine data for that individual prior to 1962 and 1963, and put that into the IMBA model and calculate what IMBA would have calculated for Type S, I would have calculated 42,670 as opposed to 12,590. So, we are talking about a full factor of 3.4 higher values that you would generate from actual data, if you had that data available.

If you actually, then, decided, no, it is not Type S, let's go for Type M, the recommended value out of Table D-1 would have

been 13,490. No. No, I'm sorry. If you calculate the value based on the empirical urine data, I would have calculated an intake of 13,490 Dpm per day as opposed to the recommended value from Table D-1 of 872. That would mean that I would underestimate that individual's exposure by a factor of more than 15-fold.

And the same thing applies to operator BBB, B-B-B. I did the same thing there. I looked at the empirical urine data prior to June of 1963, and I calculated what his intake would have been based on empirical urine data, and compared that to the recommended value, as defined in Table D-1. And again, for Type S, you would have underestimated the dose by a factor of 1.7. If you go for Type M, the underestimate would have been a factor of 7.6.

And what it comes down to, just to put everything in a nutshell, is that, for those people for whom you may not have

urinalysis data, the use of the surrogate data or cohort data, as defined in Table D-1, may very well underestimate the actual inhalation dose by a substantial margin. In the case of the two operators I calculated, it could be as high as 15-fold.

And so, when we use the GM, that is, the geometric mean of the distribution, we may, in fact, underestimate the dose to a given person for whom we have no empirical urinalysis data by a substantial amount.

As NIOSH did concede, if there is urinalysis data available, it would obviously be used as opposed to the values defined in Table D-1.

The question, however, now -- and I guess John will talk about that -- is the use of a geometric mean appropriate for those individuals where there may be an insufficient or no available data to assign an intake that is based on the geometric mean? And I think I will pass that discussion onto John.

DR. NETON: Well, before John goes, I have a question, though, Hans, or Dave maybe does, will go first.

MR. ALLEN: I was just going to point out that, again, we are comparing, we are assigning a full distribution, and he is comparing the 50th percentile, the geometric mean, to one of the higher people, which is at the far end of the distribution that we used. We use those urinalyses for determining the distribution. Yes, 95th or 99th percentile is higher than the 50th percentile. We will give you that.

DR. MAURO: Well, you know, we have been in this position before. When you are in a situation where you have airborne activity, you have your distribution, and you are going to say I am going to place someone in that environment and we are going to reconstruct his dose, and we know that there is variability in time and location; you pick the geometric mean or capture the distribution

with your standard deviation.

I guess this goes to the heart of really a philosophy. Now when you do that, the reality is the real person could very well have been exposed for time periods and locations where the airborne activity was substantially higher than the geometric mean. And I have to tell you this is one of those problems that sort of tied my brain into a knot.

For that particular person, who you don't really know where he was, when he was in a particular location, but one would argue that, yes, it is very likely, there's a 50 percent probability that his real geometric mean was higher for him by a factor of -- well, there's a 50 percent chance that the real number that he experienced was higher, 50 percent that it is lower.

Now does somehow assigning a geometric standard deviation of five solve that problem? Something about that disturbs

me. See, I would say that now, if you were to run a PoC or, say, we could run a case, in one case we say, okay, let's go with a fixed value of 95th percentile.

CHAIRMAN ANDERSON: And that's 95th percentile of the geometric mean or --

DR. MAURO: Exactly. Of the full distribution.

CHAIRMAN ANDERSON: Okay.

DR. MAURO: In other words, for the full distribution. For the full distribution, and the full distribution is a bunch of measurements, many different times, different places. And we have a guy that we don't know where he is, you know, when he was there.

All right. So, the reality is, if I was going to come up with a best estimate of what I think that guy might have experienced, I certainly would pick the geometric mean. And if I was to assign an uncertainty on what I think a guy's best estimate is, I would do

exactly what you did. In other words, for the typical person that worked in that facility over that time period, I would do exactly what you did.

However, that is not what we are asking. We are asking, no, we want to make sure that we place a plausible upper bound for everyone. In other words, we want to make sure that we don't underestimate anybody, or there is a high level of confidence we are not underestimating.

So, I find myself in a place where I say I would have used the 95th percentile of the distribution put in there, unless I know otherwise, unless I know, no, no, no, he was not in the work zone, based on knowledge of his job. And if we don't have that knowledge, then I would ask myself -- but let me go further.

If I were to run a PoC on a guy, and in one case I were to assign him a geometric mean with a geometric standard

deviation of five on that airborne activity, as opposed to, no, I am just going to fix him at the 95th percentile and hit him with that as if the entire time period he was at the upper 95th percentile, I suspect that we are going to come up with a higher PoC.

DR. NETON: Yes, we have been through this before, John.

DR. MAURO: We have, and I don't think we resolved it.

DR. NETON: Oh, we had. I thought we had. And maybe this one is a little different twist on the same old issue. And that is, if we have a complete bioassay record over a long period of time for a lot of workers, we are assigning the 50th percentile with full distribution. We agreed to that a long time ago, unless there is some indication in the guy's file that he should be at the 95th percentile.

We made some exceptions in the past. For example, Rocky Flats, when there

were questions about the adequacy of the data that we had, we went for the 95th percentile. But, by and large, where we have a complete set of bioassay records, we would use the 50th or the full distribution, recognizing that most of the workers, the workers that weren't monitored weren't usually the ones that had the high-end exposure.

Now this situation is a little different because you've got a gap with no monitoring results. And so, I will acknowledge that this is a somewhat different situation.

So, I guess I need some clarification of what are we assigning here exactly, then, because I am not --

MR. ALLEN: Well, the numbers Hans mentioned from the table in the appendix or in the TBD or the geometric mean, we are assigning a GSD, we are assigning a log-normal distribution with a GSD that was calculated --

DR. NETON: Well, the numbers that

I am seeing here are like 12,590 dpm.

MR. ALLEN: Yes, that is one of the numbers he mentioned.

DR. NETON: Now that is pretty darn high.

MR. ALLEN: Oh, yes. In fact, If you use the air samples, there was a problem that -- LaVon, you can correct me if I am wrong -- the red room was the green salt? Is that correct?

MR. RUTHERFORD: No, the red room was the highly-enriched uranium.

MR. ALLEN: Was it the green salt? Or am I thinking of a different --

MR. RUTHERFORD: I think you are thinking of --

MR. ALLEN: Okay. Never mind.

(Laughter.)

DR. NETON: Well, the 12,590 represents what? Is that the --

MR. ALLEN: The geometric mean intake dpm per day.

DR. BEHLING: For the operator.

MR. ALLEN: Right, for the operator.

DR. NETON: Hans, when you did your reconstruction, how did you do that? Because I am confused. You had data at the beginning and data --

DR. BEHLING: Yes, I had data which are defined in Table 3. Admittedly, there were only a limited number of urinalysis data for both the operator AAA and BBB. I think for the AAA operator, I had a total of, let's see, seven urinalysis data that predate June of 1963. And on the basis of those seven urinalysis data, I used the inverse calculations that would end up with an intake of 42,670 dpm per day, which is about 3.4 times higher than the --

DR. NETON: Assuming a chronic exposure over a long period of time?

DR. BEHLING: Well, there were, obviously, many more exposures post-June of

1963.

DR. NETON: No, no, let's go back to the beginning, the pre-1963 timeframe.

DR. BEHLING: Yes.

DR. NETON: You said you had seven or so samples.

DR. BEHLING: Yes, an they start on December 10th, 1962 and then go to, the last one of the seven ends up on May 29th, 1963.

DR. NETON: And you fit a chronic exposure function through all of those samples?

DR. BEHLING: I don't recall exactly. It goes back two years now.

DR. NETON: This is very important, Hans, because if you did anything with acute, I can understand why you are getting what you did. Because if I am seeing these people having intakes of 12,590 dpm per day, the urine concentrations on a chronic basis would be pretty large. I am curious as

to what those urine concentrations were in the 1963 period that you are saying --

DR. BEHLING: Well, I actually used the urine concentrations, and they are a part of Exhibit 3 in my write up. So, you can actually look at the dates and the --

DR. NETON: I haven't looked at this for a while, but I am not skeptical; I guess I am just confused as to how you could get such high numbers, given the type of intakes that we are seeing, we are applying here. There may be a difference in the way we would apply a chronic exposure model to this person versus the way you did your analysis. That is all I am saying.

DR. BEHLING: Well, let me just give you an example. For instance, the second urine sample for that individual, the AAA operator, that was taken February 11th, 1963, he had 2,125 dpm per liter in his urine. And that is a very, very high excretion rate.

DR. NETON: Right. Okay.

DR. MAURO: I think the fair question here is that, when we went through our calculations for these two people, if you were to use the surrogate model for these two people, you would have underestimated the intake, using the model that Hans used, whether that was some combination of acute or chronic or just all chronic. Granted, that is unknown right now. We would have to go back and look at that calculation.

So, I guess we are not disagreeing. What we are saying is that, to the extent to which we researched this paper over the weekend and went back to our original work that we did quite a while ago to see if it rang true, namely, does it appear that by using the chronic approach with your distribution, you would be giving the benefit of the doubt to all these workers that don't have bioassay data?

And from the work that was done before, it appears that, at least in those two

cases, it wouldn't. And so, we are left in a place where we are not seeing parity between some people that we did look at before. It appears that they would have been assigned a much higher intake for them.

Now, of course, you are going to actually do it for them because you have the data. But let's say you didn't have the data for them.

MR. RUTHERFORD: I've got a question. So, is the question really solely tied to the two years when we don't have data?

DR. MAURO: Yes.

MR. RUTHERFORD: Okay. And I just wanted to make sure that was --

CHAIRMAN ANDERSON: Because everybody else has --

MR. RUTHERFORD: Right, right. I just wanted to make sure that that is the only thing you are questioning right now.

DR. MAURO: Yes. And this business of the geometric mean, I know we have

discussed this before, and there's judgments made on when do you use -- and certainly, we are in full agreement when there is good reason to believe the 95th percent to not applied to a particular category of worker. But we are talking about the worst workers right now.

DR. NETON: Yes. No, I acknowledge that this is somewhat different because we have got a gap with no monitoring data.

DR. MAURO: Right, right. So, I guess, like I said, we did this over the weekend. Hans I know did put some time in and think about it and talk about it, to say, how should we represent our concerns? I think we have done our best to communicate that. Maybe we ought to sniff this out a little further.

MR. ALLEN: I think there's two big points here that you are not mentioning or I am thinking about different than you are anyway.

Point No. 1 are the highest monitored guys that you looked at or some of the highest ones.

DR. MAURO: They were cherry-picked.

MR. ALLEN: They were cherry-picked, sure.

DR. MAURO: Yes. No question.

MR. ALLEN: I mean, they are the high-end of the distribution. But the key point is they were monitored.

DR. MAURO: Right, I agree.

MR. ALLEN: And they are at the high-end of the monitored people.

DR. MAURO: Right.

MR. ALLEN: And many other people were monitored and got considerably lower numbers, meaning the odds of finding somebody not monitored that was in that high operator position routinely all the time is almost --

DR. MAURO: That is one of our classic presumptions.

MR. ALLEN: Okay.

DR. MAURO: The guys that were monitored were the bad actors.

MR. ALLEN: Well, I mean, why would you monitor people if you are going to ignore the high ones?

DR. MAURO: Well, see, here's the dilemma we ran into, too: usually, you pick the people that are in the area with the highest. In other words, the reason you are monitoring these guys is you expect them to be routinely in the place with the highest airborne activity and, therefore, let's keep an eye there.

But in the very same report that Hans wrote, usually we couldn't even find a correlation between airborne activity and urine sample concentrations. I mean, if you go back to the September 2009, we are concerned that --

DR. NETON: But usually the airborne way over predicts intakes because you

are not taking a particle size distribution. You are oftentimes defaulting on very insoluble materials when it is not. Respiratory protection is oftentimes used, which we never take credit for.

So, I am not surprised that we don't find correlations between airborne and urine samples. I would submit that it is most often the case that the high values are the ones that you are over predicting intakes using air concentration data.

MR. ALLEN: Because of the short duration --

DR. MAURO: Yes. I have to say, I recall -- and, Hans, you have to help me -- I recall your graph with the lines and the circles in one of the reports. And it was sort of all over the place. It wasn't that it was consistently that the bioassay was under the air. In other words, the air always overestimated it.

Hans, if you are on the line, I am

trying to find the graph that I remember reviewing, and it is not in the actual report that I am looking at right now.

MR. ALLEN: Well, John, if that is true, you are just saying the airborne has a higher uncertainty.

DR. BEHLING: No, John, there was no graph. In fact, you have to go back to, if you have my report, go back to page 13 and look at Exhibit 2, where I have a series of operators, and they also provide you data with regard to what their excretion rates were for various timeframes.

DR. MAURO: Yes.

DR. BEHLING: And then, I looked at those and compared those against the air-sampling data that were reported, and I selected two cases where the air concentrations were high that were assigned to them and the urine excretion rates are very low, and the opposite was true, where you had low air concentrations assigned to them and,

yet, there were urine data that suggests there was substantial exposure due to excretion rates. And I concluded that the air concentration and urine data had a very, very poor correlation.

DR. MAURO: Well, that is part of the story, too.

DR. BEHLING: And that's on Table 2 where I identify four operators, Operator No. 19, 33, 34, and 36.

DR. NETON: I just wanted to take a look at that, the data in the report. September 2009, it looks like.

CHAIRMAN ANDERSON: Can we proceed and do an update of this? I mean, it is a good discussion, but I don't see us heading toward a resolution on the 1961-62 without having you drill down what are these issues.

Yes, I haven't looked at that. So, I don't remember it, either.

MR. ALLEN: Well, maybe we can push the discussion into a slightly different

direction here because, I mean, this whole 95th percentile, et cetera, all we are talking about here are the numbers that we would assign to unmonitored workers.

CHAIRMAN ANDERSON: Yes. I mean, I think what would be helpful to me is to try to break these out as to what because it doesn't apply to everybody here.

MR. ALLEN: What I was going to say is, is it an SEC issue? Can't it be done and we disagree on the value?

DR. MAURO: I would say no. I mean, I jump to that pretty quickly, as you know, but it seems to me we have got a tractable situation here. It is just a matter of judgments on what are you going to assign.

The other thing that I was going to ask that I would be interested in seeing is, when you fill in this little hole where you only have air-sampling data, do we have a continuation of air-sampling data to go pre-1962?

MR. ALLEN: That's what we do have.

DR. MAURO: Go right through it and go through 1962 and then on.

MR. ALLEN: Yes, actually, what we did at that last, yes, if you look at that last graph, we actually wanted to include the year prior to when bioassay stopped; 1960 is included in this, and then the year after bioassay, it was kicked back in.

And if you look at that data, I mean, the air sampling, it looks pretty --

DR. MAURO: That was one question I had.

MR. ALLEN: Well, that was the question we had.

DR. MAURO: Yes. So, there is nothing unusual about 1962. It was just like every --

CHAIRMAN ANDERSON: Right. The facility was operating just like it did before.

MR. ALLEN: Right.

DR. MAURO: Okay. So, that being the case, that puts you in a very stable situation. What that means is that there's nothing about those years that are weird. Therefore, if somehow we could feel confident that we could place a plausible upper bound on before and after, well, the same plausible upper bound would apply to the ones in between.

DR. BEHLING: You know, John, I disagree to some extent.

DR. MAURO: Sure, Hans.

DR. BEHLING: Again, I want to go back to my initial report. If you look at page 11 of my report, I take direct quotes from letters that were written and memoranda that were written. And it turns out that 1960 was a very, very unusual year for high airborne exposures. At the same time, it is also that timeframe, 1960-61, during which we have no bioassay data.

So, what it comes down to -- and again, I want to wrap everything into a single story here -- there was poor correlation between bioassay data in years before and after these two years. So that, when you only have air concentrations, you can't really make any strong conclusions about what they would really turn into or translate into with regard to intake. And that is really where we are.

We are basically looking at urine data pre and post those two years and trying to establish what the exposure might have been during those two years when we only had air concentration. But it turns out that those two years, 1960 and 1961, were unusually high air-concentration data. And yet, we have no bioassay data, and the correlations between air and bioassay data are very poor. And that is the dilemma we are in.

MR. ALLEN: That is not really the dilemma we are in because we do have bioassay data in 1960. It didn't stop until 1961.

Right?

MR. RUTHERFORD: Yes, that is correct.

MR. ALLEN: And I thought you said you had compared them, actually.

DR. BEHLING: No, I only compared the two operators, AAA and BBB. I only had a very limited amount of data that predates June of 1963. In other words, the tail-end of 1962 and the first five months of 1963.

MR. ALLEN: Okay. That is when they started it back up, but they did have bioassay data up until 1961. So, in 1960 they actually had bioassay data.

And as far as the correlation between urinalysis and air samples, anytime you have a facility that has multiple operations where you get a short-term high airborne in one area and long-term lower airborne in another area, and somebody is going between areas, you do get a wide uncertainty in the values you would detect.

And that is why bioassay is inherently an integrated intake, and that is a much better analysis.

DR. MAURO: I guess --

MR. ALLEN: But the air sample graph that Bomber put out here, the key thing isn't so much to estimate the intake from the air samples as to show is there a trend up or down from 1960 through 1963, and it is a fairly straight line.

DR. MAURO: Well, apparently, what is important in these situations is making sure we agree on the facts.

MR. ALLEN: Yes.

DR. MAURO: And then, of course, interpreting what is important.

Right now, we do have a disagreement on the facts, right?

CHAIRMAN ANDERSON: We should be able to resolve that.

DR. MAURO: We have failed to resolve. Hans makes a point, no, it looks

like they had a couple of years that are pretty nasty and they may have fallen in the time period that is of concern. But you are saying, no, that is not the case. That is easy enough to find out. Let's get that straightened out.

Then, just another think piece related to this is that, if I were doing this, I would say, listen, let's assume, one, that, yes, the nature of the operations were such that they were continuous and nothing unusual about those years. Because if there was something unusual about those years, there is a problem. But if there is nothing really unusual about those years, where we don't have the bioassay data, then I ask myself the question, well, what would I do?

I would say, well, I would go collect the bioassay data of all those workers around those years. Let's have a lot of bioassay data. And I would estimate the upper 95th percentile intake rates, chronic intake

rates, for those workers, and I would say I am going to use that for the years -- I wouldn't even look at the air data. I would go straight to the bioassay data and say here are the chronic intake rates or the intake rates for hundreds, or whatever the number of workers you have, just before and maybe just after the time period where you don't have bioassay data and say, listen, one thing is for sure, if I assign all the workers I don't have bioassay data for those two years, I am going to give them the upper 95 percentile intakes for the workers that I do have bioassay data for around those years. And I know that the air dust loadings were basically the same continuously through.

I'm done. That is how I would have come at it. I mean, no one could argue with that.

Now I don't know where we would come out on that, but that seems to be -- you know, you need to get away from the air-

sampling data. You go straight to the bioassay data. That is the stuff we kept.

Anyway, I am going to say, this is how conceptually I would have come at the problem. I may have also done it the other way to see how they compare. There is almost like two ways at coming at the same problem.

But I guess this is the thinking that we would do over the weekend.

CHAIRMAN ANDERSON: I think some examples would be useful.

DR. MAURO: Well, see, Hans' example, I agree. Now Hans picked two examples that show that, if it turns out those people were not bioassayed --

DR. NETON: That is my question. How robust are the bioassay data sets on either side --

DR. MAURO: Yes, yes.

MR. RUTHERFORD: Actually, we have got numbers. I can tell you.

DR. NETON: There's large numbers

of people being monitored.

MR. RUTHERFORD: Now just give me one minute here.

MR. ALLEN: Well, if I remember right, it started up in --

MR. RUTHERFORD: 1957, yes.

DR. NETON: I am not worried about 1957 --

MR. RUTHERFORD: But they were coming towards the end of the startup phase or `59 issue --

DR. NETON: But what I am saying is, let's say we have very robust monitoring data, large sections of the workforce on both ends.

DR. MAURO: Both ends.

DR. NETON: And then, they didn't monitor anybody in the intervening period. And if we do what you suggest, that means we construct their exposures in the middle. You really have reconstructed exposures of the most highly-exposed people, you know, if you

have very robust datasets. And then, we are in the same situation as we are at other sites where I think the 50th percentile is probably reasonable.

MR. RUTHERFORD: All right. So, if you go -- I am going to just roughly start at 1959 because we had 138, 60, 106. The period between 1961 and 1962, actually, at the end of 1962 when they kicked back in, they jumped up and they did 196 just in that end period. Then, in 1963, we get a huge increase to 1730 bioassay samples, and it stays all the way --

DR. MAURO: So, you've got those samples?

DR. NETON: Yes. Yes, we have those.

DR. MAURO: So, you've got the data. See, to me, you have got the bioassay data. So, let's, right off the bat, I would say, given the bioassay data, there is no SEC issue here. You have got a little hole in the

bioassay. What are we going to do about that?

Now you would argue that you would go with the geometric mean. And I would say, well, why would you do that? In other words, I am saying, what about some of those people in there that you have bioassays year after year and then you skip, then there is a hole, and then --

DR. NETON: You don't know, though.

DR. MAURO: Why would you use --

DR. NETON: I mean, let's take a hypothetical example where you had everybody monitored that were the highest-exposed workers on one end and everybody that was highly exposed monitored on the other end. Why would you give the unmonitored workers the 95th percentile?

DR. MAURO: Well, I am saying, let's say it turns out within that population of highest-exposed workers, the operators, and you have got, let's say, 100 measurements,

okay, for workers. And we go Worker No. 1, and we rack them up. Here's the intake for the highest guy, the intake for the second-highest guy, the third-highest guy, all right, now all the way down. And here is our 50th percentile, right? Forget about running the log normal. Just right smack dab in the middle.

Let's say, well, you are saying now along comes a guy that we don't have data for. You know, we don't know what his intake was. But we do know that here's the rank order of 100 people. Why would you give him the one in the middle?

DR. NETON: Because what if it was an administrative person?

DR. MAURO: If he was, then I would agree with you, right.

DR. NETON: What if it was a security guard?

DR. MAURO: But I am saying it wasn't.

MR. ALLEN: But we are not giving him the guy in the middle. We are giving him the distribution. That gives him a possibility of the high-end and a possibility of the low-end.

DR. MAURO: No, but what you didn't -- see, it is just like the external that you do it with. I mean, the reality is --

DR. NETON: But we're not --

DR. MAURO: Maybe we will never agree, and that is okay.

DR. NETON: The nice thing about a probabilistic model, which is the whole risk models are based on that, we don't give high-end values for all the individual exposure parameters in the risk model.

What you are arguing is that we should behave differently when the dosimetry --

DR. MAURO: But you kick off the 1 percentile upper end.

DR. NETON: That is what we do with --

DR. MAURO: To account for the fact that there is individual variability in the risk coefficient.

DR. NETON: And the same logic applies to the dose models.

DR. MAURO: Well, now we are getting into the regulatory interpretation. I am going to look over here.

(Laughter.)

I see it as this: the way I read the rule is that, when you are reconstructing the person's dose, you have to err on the side of the person to give him the highest-plausible dose that applies to that person.

MR. ALLEN: Absolutely not. You are definitely misinterpreting it.

DR. MAURO: Then, for nine years I have been off-base.

MR. ALLEN: Yes.

(Laughter.)

DR. MAURO: See, to me, when you don't know, you don't say, "I am going to" -- because what that means is there is a 50 percent chance that you have underestimated his dose.

MR. ALLEN: If you point to the rule and read that section again, read the section around it, et cetera, it is saying we can end our research by giving worst-case conditions. That is the thing we are pointing to. And it says that we can consider the research done if we consider worst-case conditions. Plausibly-bounding worst-case conditions I think is what --

MR. KATZ: If that is the only information you have.

DR. MAURO: Right. Isn't that what I just said?

DR. NETON: But the law says we should provide reasonable estimates of dose. I mean, that is what it says.

DR. MAURO: Yes, but --

MR. ALLEN: We are saying that that is only a reason to end the research. You can't then do more research to say we could have made it higher. More research means it is almost got to go lower.

DR. MAURO: I will do it. I mean, I am just trying to be clear. I am thinking about, I have got 100 guys that work in these rooms, I've got 100 of them, and they are all the operators. These are the bad actors, okay? We will grant it.

And then, I say, all right, and I look at their average intakes based on bioassay data, becquerels per day, over a period of a year or two, whatever. And I have numbers that start over here, the highest, and go down. All right, now I have got that, and everybody is in pretty good shape. And for those people, when you reconstruct their dose, you are going to use the one that applies to him because you have the data.

Then, along comes two or three

guys that worked in that time period. I don't have any bioassay data. I say, "Well, but I want to assign some number to him." Or I'm going to say some intake. What is the intake I am going to assume that they had in that time period?

According to your argument, you would use the geometric mean, the guy in the middle. You pick the 50th guy. But you would try to take him into consideration, but we will assign him the standard deviation on him because we don't really know. He could have been --

DR. NETON: We're not assigning it. It is calculated.

DR. MAURO: No, no. The one based on the distribution that you see from your rank order.

Now I would say that is one way to deal with the uncertainty. The other way to deal with it is simply say: well, listen, we don't know where that guy worked. We don't

know where he would fit in from the highest to the lowest. I am going to give him the 95th percentile.

DR. NETON: I think we are in agreement here because at other sites where we have said, if it is clear that a person was, say, a chemical operator at a facility --

DR. MAURO: Right.

DR. NETON: -- and they lost the bioassay record, we would assign the 95th percentile.

DR. MAURO: Now that is where I am on this. I don't think -- we have no argument there. If you know this guy was an administrative assistant and never went into the operation area, you don't give him the --

DR. NETON: That is where we have measurement.

DR. MAURO: Well, but it appears that you didn't do that here.

DR. BEHLING: John, just to remind everybody, we are segregating the workers

based on their job classification. So, when we look at these numbers that are identified of 12,590 as a GM value to be assigned, we are not assigning that to an office worker or a secretary. These are operators.

CHAIRMAN ANDERSON: The issue is it is not a generic -- it is assignment of the 50 percent to everybody. That is what it says in this thing.

DR. MAURO: You understand what I am saying? I don't think we are being unreasonable, but you understand our concern?

DR. NETON: Yes, I understand. I think we need to go back. I need to refresh myself a little more with Hans' original analysis and how he did it.

DR. BEHLING: And let me also point out something else. I think Jim Neton made a comment that I think is appropriate, but potentially flawed. When you said we only really focus our attention on those people that are potentially likely to have the

highest exposure, that may be due to air sampling.

And as I said, if you look at Table 1 in my report, I identified air-sampling data for 1960 for a whole bunch of operators. And then, on the far end of the page there in the last column, I identified urinalysis data that was also available.

And you find, based on the correlation between air concentrations to which these people were exposed and that were assigned an air concentration value, if you compare that to their actual empirical urinalysis data, you find very poor correlation, which means potentially the following:

They may have identified workers in areas where there are known measurements of high air concentration and said, "You will submit to a urinalysis because we think you may be the maximum-exposed individual." But, as that table also shows, there may be poor

correlation, meaning that a person may have had high exposure that involved areas where the air concentrations apparently were not at a level that would raise a red flag.

And yet, as it turns out, as I pointed out in one of the tables, when I compared them, they identified four individuals, two of which had high air concentrations and, yet, had low urine excretion, and the reverse was they had high urine excretion and low air concentration. So, they may have selected people for urinalysis on a basis of air concentration that turned out to be a poor indicator for exposures.

MR. ALLEN: But you admittedly picked the high guys to analyze there.

DR. BEHLING: Of course. Yes, I took the extremes. No, there is no question about that.

MR. ALLEN: Yes, I understand that, and I would, too, you know, to try to test the limits there. But if we could go

through and show a relatively-consistent urinalysis on the majority of these people, would that not prove that they knew what they were doing as far as picking the high guys?

DR. BEHLING: Yes, on average, yes, always. I mean, if we always look at what is representative of a population, an average value with a standard deviation might be appropriate. But, as I pointed out, there may be individuals such as our AAA and BBB operators whose exposures, based on empirical urinalysis, would suggest a much higher intake than are being assigned by the geometric mean.

MR. ALLEN: But I am saying, if AAA is relatively consistent throughout time and BBB is relatively consistent and Employee A, B, C, they are all consistent with themselves across time, then we do have the high guy, and he is AAA and BBB. The other guys that are sampled by the company are lower. So, presumably, the ones that are not sampled would be even lower yet.

DR. BEHLING: Well, this is exactly the point I just made. You may not have sampled everyone that should have been sampled because you may have falsely assumed that air concentrations are necessarily a good indicator for expecting them to submit urine samples.

MR. ALLEN: But you have already said that doesn't correlate with AAA and BBB. So, they couldn't be consistent with everybody across time if air samples is what they used.

DR. MAURO: Wait. You said something that is very important. The people that are of concern that you are going to reconstruct the doses for this two-year time period where you don't have bioassay data, do we know who they are and do we have their data for 1959, 1960, 1961, bioassay data?

DR. NETON: It is probably a mixture.

DR. MAURO: I mean, if you know who they are. I mean, when you think about

it, see, the way I look at it is forget about the air-sampling data. I mean, you have bioassay data. And if you have bioassay data for a guy for 1957, 1958, 1959, 1960, and then, all of a sudden, you don't have anything for 1961 and 1962, then you have got it for all. You're done. So, I don't know why you even go to the air data.

MR. ALLEN: Well, we don't for guys with the bioassay data.

DR. NETON: In the bioassay data, you are never going to be --

DR. MAURO: I thought the problem was --

DR. NETON: It is the people when there is no one with any monitoring data at all.

DR. MAURO: Okay. So, then, I misunderstood. So, they are a different group of people that were not monitored. So, it wasn't that you have -- I thought it was a time period that was gone. So, now you have a

group. Okay, right.

DR. NETON: See, we would do what Hans did to calculate a guy's intake, if he had bioassay data before and after.

DR. MAURO: Right. Okay. So, now you say, okay, now we have got a group of people that, for some reason, don't have bioassay data, and they didn't have any before and after.

DR. NETON: There you go.

(Laughter.)

DR. MAURO: Not only is it 1962 and 1963, they don't have any.

MR. KATZ: They are unmonitored workers.

DR. MAURO: The unmonitored workers.

DR. NETON: That has been my point all along.

DR. MAURO: Believe me, I am trying to understand. Your position is that, well, this group of people that don't have any

bioassay data for this time period, I am assuming that they don't have any bioassay period for an earlier time period or they don't have any bioassay data -- that is what you are saying -- or very little. So, they are a special group of people.

And your argument is maybe the reason they didn't have that bioassay data was they were people that didn't really have much potential for exposure. I didn't see that case made.

DR. BEHLING: Well, you know, I still have a problem with us making that assumption, John. It would be okay if you were talking about the secretary or the office worker. But when you have a chemical operator and that is his job justification, if there is no bioassay data, you would have to question why. Is it data missing or is there an oversight that says he should have been monitored but somehow or another he was not? I don't know how to answer that question when

you have someone who is --

DR. MAURO: That is a great question. That is a reasonable question.

CHAIRMAN ANDERSON: Is that a hypothetical?

DR. NETON: Yes, I don't know. That might be a hypothetical. There may be none. I don't know. We need to follow up.

DR. MAURO: Yes. I think we are really trying to come to closure on this in a way that we are all comfortable with. And I understand where the holes are now. Okay.

CHAIRMAN ANDERSON: So, moving forward, yes, the action item is, John, you guys are going to redo the --

DR. MAURO: Well, I don't know if there is anything to do. I think it is in Jim's court.

DR. NETON: Not me, but someone else is going to look at the analysis. Yes, we need to go back and reexamine Hans' original analysis --

CHAIRMAN ANDERSON: Yes.

DR. NETON: -- of September 2009, his bioassay analysis.

DR. BEHLING: And I would just like to ask Jim, or whoever is going to do that, take a look at the operators because they are obviously the --

DR. NETON: Yes, I agree. Yes, we will look at the operators and we will look to see if that really does apply, yes.

MR. KATZ: So, it is more than just Hans' analysis, the discussion here, too. It is the issue of who is this set of workers.

DR. NETON: Exactly how it is going to apply.

CHAIRMAN ANDERSON: Especially in the context of the SEC, I guess.

DR. NETON: We have got a handle on what we need to do, to look at.

CHAIRMAN ANDERSON: Okay. The next issue, then -- I think we have got what is going to happen.

MEMBER FIELD: Andy, can I ask a question?

CHAIRMAN ANDERSON: Oh, sorry, go ahead, Bill.

MEMBER FIELD: Yes, looking at this, now one of the items that we are looking at is nuclear air-concentration data, correct?

MR. KATZ: Right.

MEMBER FIELD: Okay. If you look at Table 1 there, the first two rooms there, the red room and the green room, it is my understanding these are the rooms that had the highest potential exposures.

MR. KATZ: Right.

MEMBER FIELD: Okay. What I am trying to figure out is, why in 1962 is there one-fifth less sampling and one-ninth in 1962, but yet other rooms, where I am assuming there is less exposure, the number of air samples went up? I am just trying to figure out why there are so few in 1962 as compared to 1961.

MR. RUTHERFORD: I think part of

that just may be the data available to us, but I am not sure other than that.

DR. MAURO: When I was reading the text with this, I remember that the argument was made that we wanted to save some money. This was back in the DOE days. They said, "Listen, let's cut back on the bioassay program." There were actually some worries there. They said, to conserve resources, maybe we could cut back on the amount of bioassay data because we have a whole lot of bioassay data. And then, of course, that turned out to be a problem because, after that hiatus, they realized that there were some really significant intakes.

But what I didn't know is that it had to do with particular rooms. That is interesting.

DR. NETON: Well, if you look, it is most interesting as well -- I am just sort of reading this on the fly -- the number of integrated personal dust exposures went up by

an order of magnitude. It may be that they supplanted the six monitoring stations with these combination BZGA samples that they put on the workers.

Because it is a tremendous increase. It went from 132 in 1961 to 1847 in 1962. And based on the footnote I see here, we are not exactly clear what they calculated, how they calculated those values.

MEMBER FIELD: It is just interesting, in some of the rooms the sampling actually went up.

DR. NETON: Yes, the pellet plant went up.

MEMBER FIELD: But it is surprising to me that in the green room for 1962 there are only four observations.

DR. NETON: Right, but 1962 is where they quit taking bioassays, though, right?

MR. RUTHERFORD: So, 1961 they quit taking and restarted back in late 1962.

DR. NETON: For some reason -- and maybe this is something we can dig out of the records -- what these integrated personal dust exposure samples were. I mean there is a tremendous number of samples.

MEMBER FIELD: I think that would be really helpful to know.

CHAIRMAN ANDERSON: Yes, I agree.

DR. NETON: Yes, I mean, because if you have got 1800 personal air samples that include a large part of BZ samples --

DR. MAURO: So, they kicked in this big BZ program and knocked down on the bioassay program.

DR. NETON: Yes, and the individual fixed-station samples, as Bill points out.

DR. MAURO: That is an interesting story.

DR. NETON: Yes, yes. So, we need to figure that out a little better.

MR. KATZ: Okay. So, that is

another action item for DCAS. I've got it.

CHAIRMAN ANDERSON: Okay. Let's maybe take a break --

MR. KATZ: Yes.

CHAIRMAN ANDERSON: -- for about 10 minutes, yes. Then, we will go through the transuranic material.

MR. KATZ: So, I am just putting the phone on mute while we are on break.

(Whereupon, the above-entitled matter went off the record at 10:42 a.m. and resumed at 10:56 a.m.)

MR. KATZ: This is the Advisory Board on Radiation and Worker Health, the Uranium Refining Work Group.

CHAIRMAN ANDERSON: And we are still discussing United Nuclear. We have the second White Paper by Chris regarding transuranic from recycled uranium buried at United Nuclear.

MR. RUTHERFORD: Yes, this is LaVon Rutherford.

One of the issues brought up by the petitioner was the potential for transuranics from recycled uranium buried at United Nuclear. We went back and we actually looked at that a little more in-depth. We also looked at how we handled that in OTIB-4.

If you look at the White Paper, the White Paper actually identifies in Section 3 some site sampling and analysis that we did or that was done during the decommissioning project, a characterization report, and a number of different surveys and such that were done to determine the activity concentrations of various radionuclides at this site.

If you go to Table 1 in the report, you can see that the average soil concentrations from groundwater surface -- they actually did a radionuclide analysis on that. They had americium, neptunium, plutonium, tech-99, thorium-232 and uranium-234, -235, and -238. And they had the concentrations from those. That was from a

Westinghouse August 2009 report.

If you follow along in the report, you will actually look at the activity fractions relative to the total uranium. We did a comparison of that in Table 2.

And then, we took OTIB-4 and we compared the activity concentrations recommended from OTIB-4, which is based on, I think, depleted uranium, if I remember correctly, and those concentrations, and we compared them and recommended the use of OTIB-4 concentrations and showed that the OTIB-4 concentrations are significantly higher than the actual activity concentrations that were derived from, or activity fractions that were derived from the soil concentrations.

I would point out that the report points out that, when you are dealing with higher-enriched UF6, the recycling project or the actual production of that UF6 drops the recycled contaminant significantly through that process, and that is confirmed in a DOE

report as well, and it is also cited on the front of the White Paper.

That is pretty much it.

John?

DR. MAURO: I just had one question. I agree with you regarding you are working with the back-end of processing that started with ore.

MR. RUTHERFORD: Right.

DR. MAURO: But you are not starting with material on that --

MR. RUTHERFORD: Right.

DR. MAURO: But is there any place where, if you had some RU in the material that showed up and you were working with whether it was UF6 or UF4, whatever it is you are working with, and I guess you are mainly reducing it here --

MR. RUTHERFORD: Right.

DR. MAURO: You are bringing it down to a metal. Is there any part of the process which would result in side streams,

not with separated out in concentrate, any RU, you know, the way that happens in other places?

MR. RUTHERFORD: Right. Yes, we didn't identify any, but what we did point out was the fact that the concentrations that we found in the soil -- and we also recognize that some, we do believe that there was material sent from Mallinckrodt that was buried on the site that actually had a higher concentration of the recycled contaminants. And those were buried on the site as part of that as well.

And the fact that dealing with the high-enriched material, as I mentioned, it drops those contaminants significantly, to the point. So, we didn't identify a specific process that could have concentrated those.

DR. MAURO: Okay. And so, the main philosophy is that the place where you can have the highest amount of RU material that might have shown up is at Mallinckrodt.

MR. RUTHERFORD: Right. And that was buried.

DR. MAURO: And that was buried. Any other RU that might have been associated with the actual product that was processed, if anything, is going to be lower than that.

MR. RUTHERFORD: Right.

DR. MAURO: First of all, it started off lower as a product --

MR. RUTHERFORD: Right.

DR. MAURO: -- when it started in the system. And second, you don't know of any process whereby the process reduces UF4 and UO2 that would be a way in which that stuff would be extracted out and generate concentrations which might have been higher relative to uranium, higher than what you actually saw in the Mallinckrodt? I mean, that is the only place where I see an ultimate --

MR. RUTHERFORD: Right. Yes.

DR. MAURO: You understand what

I --

MR. RUTHERFORD: Yes, I know where you are going with it. The same thing with Fernald, I believe.

DR. MAURO: Yes.

MR. RUTHERFORD: I mean, I wasn't involved in that. But, no, I think we haven't identified anything.

Now I do want to point out, you will notice I think the thorium numbers were higher, the activity fractions of thorium were higher in the burial than the OTIB-4 values, but that is because of the thorium process that actually occurred onsite.

DR. MAURO: Oh, yes, thorium is --

MR. RUTHERFORD: Right.

DR. MAURO: -- that's another White Paper, a different one, right?

MR. RUTHERFORD: Yes. Oh, yes, I would just point out, if you had a question, why one of those was higher. Okay.

CHAIRMAN ANDERSON: So, at the

very end, you talk about the thorium processing. Is there going to be another White Paper on that?

MR. RUTHERFORD: Oh, we are going to talk about that one.

CHAIRMAN ANDERSON: There is?

MR. RUTHERFORD: There is a White Paper on the thorium.

DR. MAURO: The Casey-Davis White Paper.

CHAIRMAN ANDERSON: Oh, okay.

DR. MAURO: Okay. Okay, fine. I have to say, as far as SC&A is concerned, I mean, I have got to tell you I didn't look at that one paper. I don't know if anyone else did in the group. I understand what you are saying.

We agreed with the fundamental idea that when you are starting with UF6 and UF4, you are not starting with something that is going to develop an upper value, and that the Mallinckrodt waste would certainly be

bounding.

And that is your plan, to go with that ratio?

MR. RUTHERFORD: Yes, OTIB-4 ratio, which is actually significantly higher than the ratios we had in the soil.

DR. MAURO: All right. Then, I have to say, I mean, I jumped to the conclusion pretty quick. I like it.

MR. RUTHERFORD: All right.

DR. MAURO: Okay.

CHAIRMAN ANDERSON: Bill, do you have any comments on this White Paper?

MEMBER FIELD: No, I don't.

CHAIRMAN ANDERSON: Okay. So, that takes us, do we want to do thorium before petitioner issues or the petitioner issues?

MR. KATZ: So, is that closed?

CHAIRMAN ANDERSON: Yes, I think we got the detailed discussion that we wanted.

MR. KATZ: Okay.

MR. RUTHERFORD: It doesn't matter

to me, whichever one you want to go to.

CHAIRMAN ANDERSON: Okay. Well, we may have petitioners still on. So, let's do the petitioner issues.

MR. RUTHERFORD: Okay. Now do you want me to go through each one of these in here, because there's about six pages of them? But I'll tell you what we did.

CHAIRMAN ANDERSON: Yes.

MR. RUTHERFORD: And if there are specific ones we want to talk about, we can talk about them.

The question came up -- and I think it may have been Hans, it may have been somebody else within SC&A -- and identified that they were concerned that it wasn't clear from the Evaluation Report that we'd actually pulled out all the petitioner issues and addressed all the petitioner issues.

CHAIRMAN ANDERSON: Yes.

MR. RUTHERFORD: So, what we did was we went back and we took the petition,

broke it down, and we pulled out everywhere where we saw a place in the petition that had an issue, and then we tried to address each one of those.

I mean, you can look at the first one, recycled uranium. We put a White Paper out on that one. There is a number of these. There are issues of workers working with bare hands. There are issues associated with whether we had bioassay for everyone. There are some issues about the chemicals and people being exposed to a number of different strong mineral acids, and so on. And we pointed out that we do not dispute that chemical exposures occurred at the site. However, that is not part of what we are dealing with here.

It talked about workers potentially taking contamination home, and we addressed that as well.

So, there's a number of issues in here. If anyone has any specific one they would like to discuss, we can discuss those.

CHAIRMAN ANDERSON: I guess what I would do is, since this really is responding to the petitioners --

MR. RUTHERFORD: Right.

CHAIRMAN ANDERSON: I would ask, if there are petitioners on the phone, if they have specific comments or would like clarifications of any of your comments.

MR. KATZ: Bill, do you have any questions about the responses to these?

MEMBER FIELD: No, I don't.

CHAIRMAN ANDERSON: I think it is helpful to have broken out the issues as you saw them. And now, if something has been missed or there are new issues, if the petitioners have them, it would be helpful to hear.

MR. KATZ: So, for petitioners, if you have seen the responses from DCAS, do you want to raise additional questions or questions about their responses?

MS. EATON: This is Clarissa Eaton

on behalf of the petitioners. Can you hear me?

MR. KATZ: Yes. Thank you, Clarissa.

MS. EATON: Thanks.

Yes, real quick, I only wanted to mention the chemicals. I made mention of that to make a point that this site was so badly contaminated, not only onsite but offsite as well.

And how do I know that? I know that because I was one of the twenty-two homes that had my well, my private well, impacted with about two pages of five-syllable chemicals that I couldn't even pronounce.

The site's monitoring records, as Hans has so graciously interpreted, that the poor correlation of what little data they have, it doesn't make sense.

There's a lot of things I would like to say. I am a little hesitant to say them right now.

But I think there is a reason that the monitoring data ended in 1960. We know when things are in a process of being done to protect one's own entity, that business practices so easily go astray.

Westinghouse, who is also the administrator of the documents, at first were stated that didn't exist, and then truckloads come into the picture. Westinghouse, being the administrator, who has been cited in other states for falsifying documents, that is an issue.

We have already got one source deemed unreliable, but now we are dealing -- thank you, Westinghouse. Anyway, to make a long story short, we have a lot of unreliable people.

What is that noise?

MR. KATZ: Somebody was doing something with their phone. All we know --

MS. EATON: I am not surprised.

MR. KATZ: Well, it is someone on

the line here, most likely a person in the public's phone because it is probably not a government phone. But, please, if you are listening in, please mute your phone.

There it goes. Thank you, Clarissa. Go ahead.

MS. EATON: Well, back to what I was saying --

This is unbelievable.

MR. KATZ: It's okay, Clarissa. We are here. We hear you.

MS. EATON: I think at this point I am going to turn it over to any employees. Are there any employees on the line?

MALE PARTICIPANT: Yes, ma'am.

MR. KATZ: Do you want to, whoever that is who said, yes, ma'am, do you want to identify yourself? You are welcome to make comments as well.

MALE PARTICIPANT: Well, I got back from break a little late. But I don't know where you took from break and where you

are now.

But, yes, I was an employee of United Nuclear from 1962 to 1966. I have submitted a petition.

And there are several -- I don't know exactly -- I would like to talk a little bit about bioassay reports. On my report, they took my bioassay results and did my reconstruction from that. Then, I got my report back, and they said they had a total of nine bioassay samples taken in that four-some-odd years and that, of that, six were over the limit.

And so, they were going to include the other three. They would conclude and give me those higher results that I had gotten from my previous one, previous high ones, and they would use that to calculate that.

And my point being, I am not sure that is a good practice of just assigning, out of the air, numbers to fill in holes. That is one of my concerns.

And there were, along the lines of what Clarissa was saying, there were many, yes, many practices -- and I am not a complaining employee, believe me -- but the company treated me good.

The old Atomic Energy Commission days were a lot different than they are now, and the practices were a lot -- the companies were treated a lot differently. We had no surprise inspections, for example. We always knew they were coming in. The AEC always cleaned everything up.

I know this is all just speculation. It is not complaining, believe me. But the practices are different now than they used to be, and I am well aware of that fact.

I do believe what Clarissa is saying, that in all honesty, that the company were CYA a little bit when it came to the 1962-1963, the air sampling and the missing portions of certain records. You just have to

think that, from what you see and what you hear and what you know personally.

What I haven't heard discussed here a lot today is the item plant. The item plant is where I worked for three years. The item plant was high-enrichment. It was of Navy nuclear fuel. It was a confidential nature. I don't know whether I can discuss that here or not. I assume -- I don't know. But it is hard to discuss something in detail when you don't know whether you are limited to that or not for security reasons.

But we made high-enrichment fuel for nuclear subs and aircraft carriers, and so forth. It was all in one place. It was called the item plant. I don't hear a lot of discussion about the item plant. I hear red room. That was high-enrichment scrap recovery. I hear green room and blue room. I am familiar with all of these. But those were lower enrichments.

They were segregated by

enrichments, as you go up the line. The red room and item plant were the most critical high-enrichment areas.

And then we had the thorium problem in the pellet plant during 1964. I was there for that also.

But the item plant, it seems that nobody wants to discuss item plant: the practices and the exposure rates. In the item plant, they were supposed to monitor your intake. If your exposure came up, they would move you to the blue room or the green room or out in the yard, or so forth, which made sense. I mean, I am not complaining about that.

But there were some of us who spent our whole time there because we were the QA portion, we were the QC portion, we were the sampling portion, we were the monitoring portion, and the item plant technicians. We were one per shift.

We stayed there. We never got

moved, except if we didn't have an order. For example, we went over into the pellet plant in 1964 for a little while and helped them with their pellets and the thorium process. Lucky us, I guess, but we were just fortunate.

But the item plant I never hear really discussed. And I would like to hear more about the item plant, and the workers there had to be highly exposed. We had the green uranium dioxide of a certain enrichment, high enrichment. It went all the way up to the finished, processed product for the reactors. We were exposed to it all.

And the red room, yes, I hear about it. That was probably because the three or four employees who were exposed highly to this red room made all the headlines as far as the AEC is concerned and Oak Ridge, Tennessee. And these people were taken down for whole body counts and all that.

But, there again, the item plant was never really openly discussed that I hear

in any of these meetings. Maybe I am just missing something here.

But there are a lot of loopholes in our process of monitoring in the item plant, I can guarantee you.

But I listen to your conversations about -- I know you have the statistics and you have to put probabilities and all this in your background investigations, but it doesn't account for everyday workers. It doesn't account for someone who has been there, exposed. It didn't account for an uptake, for example, in -- we worked 12-hour days, 10- and 12-hour days. When we had a project for the Navy, we wouldn't get a weekend off for eight, ten weeks.

But when they calculate your exposure record, it is done on a day basis, a 40-hour workweek. That don't make sense to me, either, but it is just another thing that I know here.

I am not faulting any of you

gentlemen for your background analysis and all your extrapolations and all, but I don't think it takes into consideration the physical locations of the furnaces and the pots and the process of acid leaching and the process of making this material as an exposure for each individual little area in that item plant.

If we take the exposure records of, for example, the people in the item plant and the red room, lump them together -- and I was, on my evaluation, by the way, I was classified as an operator because they did that. They allowed that, and that's great. That's fine. That was, I understand, the greatest exposure that they had assigned to me.

That did allow for that 12,000, I think, Dpm per cubic centimeter that the previous gentleman had talked about. He calculated that it was 42,000 potentially instead of 12,000. So, I was at least given the 12,000 there on that part.

But I think I would like to hear more discussion and more looking into the item plant and red room, where the high exposure rates were. It is a matter of record. Or excuse me. It should be easy to find that those two areas were absolutely the highest enrichments, so they had to be the highest exposure, internal exposures especially.

CHAIRMAN ANDERSON: Thank you.

Go ahead.

MR. RUTHERFORD: Yes, this is LaVon Rutherford. I will respond to that.

And you make a good point on the item plant; there's not a lot of discussion. A lot of that has to do with its classified nature, as you know.

What we do have, I do want to point out, we do have air-monitoring data from the item plant. In fact, one of our reports we put out -- and I know Clarissa got it and the other petitioners got the reports -- you will notice on our air-concentration report

that we have on Table 2 it identifies the different rooms that had samples that were above administrative control level. And one of those samples is from the item plant. Actually, I think a couple of the samples are from the item plant.

And so, we do have air-monitoring data from that plant. Also, as you pointed out, we do have bioassay data from individuals that worked in that plant. So, we do have that data to reconstruct that internal dose as well as the external monitoring data from those individuals as well.

And I think we have enough information that we could, I mean if it became necessary, we could identify a lot of individuals that specifically worked in the item plant through their CATIs and their bioassay data and through their claimant records.

But I do understand your frustration there. Because of its being a

classified nature, we haven't discussed it a lot.

DR. MAURO: Bomber, I have a question for you.

MR. RUTHERFORD: Sure.

DR. MAURO: On this window where we don't have the bioassay data, do we know that it includes workers that worked at the item plant?

MR. RUTHERFORD: Yes, we have -- oh, do we know if -- actually, we have air monitoring. That is actually part of this.

DR. MAURO: Okay, so part of the data.

MR. RUTHERFORD: Yes, is in there, yes. Yes.

MALE PARTICIPANT: They quit the air sampling because of financial. It was financial. I mean the bioassay.

MR. RUTHERFORD: Right.

MALE PARTICIPANT: They would say they didn't need it. The air sampling was

okay to do. And then, they got in trouble in a very short period of time when they found out they should have had it because they were getting some exposure rates that just didn't match up in the air sampling. So, they went back to it.

They were forced to go back to it. That was part of an agreement they had with the AEC and the government, that they had to go back to that. They had to -- they were getting in trouble.

And they came out and they inspected. I wasn't privy to the meetings, but I do know, as a result of that, we initiated that back in.

But, yes, it is frustrating when your topic can't get discussed. I don't know how to get around that, to tell you the truth, but I just want to make sure that the item plant is part of the situation that is of a separate classification than an office worker or a guard or one of, I call them, non-exposed

people.

MR. RUTHERFORD: Not to interrupt, but, you know, if you think it would be very helpful, we could set up a classified interview with you where you could freely speak about the item plant and speak -- in fact, I could do that interview and be a part of that interview. I am cleared to do that.

So, if you think it would be helpful, we could set that up.

MALE PARTICIPANT: Well, do you think it would be helpful?

MR. RUTHERFORD: Well, I think, sure, any more information is always helpful. So, yes.

MALE PARTICIPANT: Because I can walk you step-by-step through that process from the time it comes in the door until it goes out the door.

MR. RUTHERFORD: Oh, yes.

CHAIRMAN ANDERSON: Yes, that would be very helpful.

MALE PARTICIPANT: I can tell you the tech specs on it and everything else you want to know.

(Laughter.)

Then, you would be in the same boat I'm in.

MR. KATZ: So, what is the best way, LaVon, for this fellow to contact you?

MR. RUTHERFORD: Actually, can you --

MR. KATZ: Let's not do it on the line --

MR. RUTHERFORD: No.

MR. KATZ: -- an open line.

MR. RUTHERFORD: No, but if I can get his --

MS. EATON: I will forward you the information.

MR. KATZ: Thank you, Clarissa.

MR. RUTHERFORD: Thank you. I was hoping you were going to jump in there.

And then, I will contact you, and

we will work it out. We will get it set up.

MALE PARTICIPANT: Okay.

MS. EATON: If I could interject for a moment, that is another good point. I wonder how many sources have you used to get this information. I mean, it just seems like we went from no information to a host of information, but do we really have all the information? Because if there's people like him, I am sure there's 20, 30 more. Have these people been contacted?

And Ed's private cases, you know, with the adjudicator, they were very understaffed and they didn't even contact some of the people that he listed as references. Those people were never contacted. Or at least Ed was told by those people they never once got a phone call on his behalf.

And then, I found out from the adjudicator that they were understaffed somewhat, which I get. You know, that's the times we're in.

But do we have all the sources? What sources do we have? Because we know the data is insufficient.

MALE PARTICIPANT: Well, Clarissa, this is Brian again, but you are talking about Ed. I was one of the people who he put down as someone who would know the process and the facts of the area, and I was never contacted.

MS. EATON: Yes. See, so I don't know. I hate to be a skeptic, but at this point, I am just thinking about all the time and resources wasted on something that is so clear.

The housekeeping was terrible. I mean, it was so terrible it went offsite, you know. I mean, the cards are all on the table here.

I just feel so bad for 'identifying information redacted'. 'identifying information redacted', my petitioner 'identifying information redacted', who has prostate, kidney and now liver cancer,

you know, he is not in a good place. I think we should get this together, all of us.

MALE PARTICIPANT: For one example, Clarissa, let me just say it happened to me, and, believe me, I am not a complainer. It is that, if you look back over your career, we used to have a Geiger counter, and you guys may have heard this before. As we would come through to leave, we would take our smocks off and our clothes off, and then we would wash our hands and we put our hand under the Geiger counter. It was permanently mounted on the door to the exit to the guard station.

Well, if you pegged that Geiger counter, if it alarmed, you washed your hands. You washed your hands in the sink right next to you. You would try it again as soon as you dried your hands off. If it rang it the second time, you washed your hands again. If the third time, you went on home and signed your name. That was it.

I mean, times were different then

than they are in a nuclear facility now, gentlemen. I'm 69 years old. I am sure you guys are a lot younger. But I can remember those days.

And there were air-line masks on occasion, and there were some respirators on occasion, but it wasn't nothing like today.

If you are going to recalculate, if you are going back into dose reconstruction, in my opinion, just my opinion, you have got to mentally put yourself back in the time in which it occurred, in the sixties, not in 2011.

And I know you guys are educated in 2011 times with the Nuclear Regulatory Commission, but you have to put your mind back. And I think that is what I hear people saying, there's frustration. We are hearing you say, well, we can monitor all this from 20, 30 years ago and we can tell you that, yes, this was your exposure and to a 50 percent probability that your cancer was not

caused by this.

Okay, I am sure you can mathematically justify that number maybe, but you didn't live in those times under those conditions, under those rules and regulations. And those companies at the time were wanting to survive. They were wanting to make money.

And to be honest with you, we didn't know any different. We did what we thought was the best.

But I don't see how you can reconstruct something -- I just don't see how you can reconstruct something when the rules were so loose. If you could put that in today's timeline, then, yes, I agree you could reconstruct it, but you couldn't in those days.

I know guys that took pellets home, for crying out loud, because they put them in their pocket and walked home with them. They brought them in the next day. There was no monitoring.

And they say, yes, your urinalysis. Well, in four years and something, I had, they say, they say that I had nine records. Well, six of those were over the limit, and they gave me credit for those and they brought three up that weren't and said, okay, you're fine. Here's what you've got.

That doesn't -- how many thousands of hours were put in the place, and how do you account for the air sampler that may have been up in the corner in the item plant? We knew it was there, had that little air sampler running 24 hours a day. Your HP guy would come and take his little sample, smear sample. But his face wasn't on the side of that air hood eight hours a day, six days a week, or whatever it was, at all times. You might get the influx of a spike, but not, I say under normal conditions, there was no monitoring done like there is today.

I will get off my soapbox, but I

wanted to make a point. I am not hearing all that. I am hearing mathematics and calculations, and I don't hear about rules and relaxation of the rules. And that I think is what people are so frustrated with your Committee about, is they lived it; you guys have the tough choice of coming in later and trying to make sense out of some of this.

Some of the sense out of this, guys, is that they were just lax. I am not saying they need to be sued or nothing else. All I am saying is, because I worked there voluntarily, all I am saying is you couldn't believe how lax these places were, and there are very extreme, high-radiated circumstances. We dealt with them the best we had, the best this country could put out. We dealt with it, and we used it, and we made stuff out of it.

But you guys have the unfortunate task of trying to come years later and say, well, you do qualify, I'm sorry, you've got only one cancer and it really don't count as

much, well, you've got two cancers, and one of these is a high probability, so, yes, we are going to let you be taken care of.

I wouldn't want your job, and I feel sorry for you. But, at the same time, I think you need to put your mind-frame back in time. That is all I am saying.

CHAIRMAN ANDERSON: Thank you.

MR. KATZ: Thank you.

MS. EATON: Thank you.

And I just want to apologize for being so emotional. I am a little frustrated. However, SC&A, I am not frustrated at all. I appreciate everything that you are doing.

MR. KATZ: Thank you, Clarissa.

MS. EATON: Thank you.

DR. MAURO: Bomber, when you make these arrangements, can I have one of our guys --

MR. RUTHERFORD: Yes.

DR. MAURO: I have got to say, I don't recall SC&A mounting an interview

campaign on this. I don't recall if that --

MR. RUTHERFORD: Yes, we actually interviewed a number of individuals for the evaluation. And then, we actually did some additional interviews when the neutron issue came up. So, we have interviewed, I am thinking, around 15 to 20, if I can remember. I am counting the three additional that we did. So, we have interviewed, but obviously this additional interview will only help us.

CHAIRMAN ANDERSON: It is some more fruitful --

MR. RUTHERFORD: Right, right, right. We actually had, during the evaluation, we had a group of workers on the phone at one time.

CHAIRMAN ANDERSON: Okay. Are there any other individuals who would like to comment or weigh in?

(No response.)

Okay. Let's go to the last paper, the thorium intakes.

MR. RUTHERFORD: All right. We can jump on this one.

A little background: 1964, United Nuclear, as was mentioned by the operator, that United Nuclear did some pelletizing of some thorium material. And for that operation, there was no specific -- it was roughly a nine-month period in 1964. For that operation, there was no bioassay done.

They controlled it based on air sampling. They had a maximum allowable concentration identified for the thorium work of 2 to the minus 11 microcuries per milliliter.

We went through and we felt -- previously, during our evaluation we looked at the air-monitoring data and determined that we felt the air-monitoring data was sufficient for us to reconstruct the thorium exposures.

At one of the Work Group meetings, it was brought up, the question whether the air-sampling data was representative enough

for us to reconstruct the thorium exposures. So, we went back and we did some additional work here.

If you go through the White Paper, it talks a little bit about the process and the enrichment that you are dealing with. The air monitoring that we have, we had 210 air samples over that period. Of those 210 air samples, 75 were general area samples. The other samples were breathing zone samples.

We went back and we looked at -- we had a drawing. If you look in Figure 1, there is a drawing of the pellet plant in 1964 with the locations. The air samples, the numbers are for breathing zone samples and the letters are for general area sample locations. And so, you can see where those are laid out.

And then, we looked at the representativeness of that. Again, we said we had 143 of those were breathing zone samples, I believe.

We also looked at how they were

analyzed. They were only analyzed for gross alpha. And then, we looked at, if you go on later in the report, in Table 1, you look at a breakdown.

We wanted to look at what mixtures would possibly give the highest exposure concentration based on the alpha activity, whether it is the low U-234, the mixture. We looked at just natural thorium, and then we looked at what we thought would be the highest exposure potential, which was recently-produced thorium oxide. Mainly, it was thorium-232 or -238 -- -228, and equilibrium. We laid those out in a table.

Then, if you go on to Table 2, we actually took those comparisons further into just different solubility.

And then, ultimately, what we concluded was the air sample data that we had was representative enough for us to reconstruct dose, and we would use, the urine bioassay data would be used for the uranium

intakes, to define uranium intakes. And then, we used the distribution that we developed based on these air samples to define a thorium intake. And then, we would use the mixture that would provide the highest dose to the organ of concern for that.

And that's it. Do you want to add anything on that or did I hit it all?

MR. ALLEN: I guess you did.

MR. RUTHERFORD: Okay.

DR. MAURO: Hans and I read through this, and we find the report mainly, the bottom line, two engine 10 air samples, a large portion, breathing zone, and you are using the 95th percentile.

DR. NETON: Yes, for the operators.

DR. MAURO: For the operators. Yes.

When you know, but if there is any ambiguity, yes, we default to the operator. This is, what I would say, the classic

approach that we always agree with. We didn't think that is what you did on the other one.

(Laughter.)

DR. NETON: I just want to make you understand.

DR. MAURO: You are being consistent. And so, now, yes, this all looks -- we find it favorable.

CHAIRMAN ANDERSON: This detail is very helpful.

Bill, do you have any comments?

MEMBER FIELD: I think it is very fair, very helpful.

CHAIRMAN ANDERSON: Yes, and I didn't realize there were that many samples. That is really helpful. Okay.

MR. KATZ: That has been closed?

CHAIRMAN ANDERSON: I think that issue is closed.

MR. RUTHERFORD: One issue we didn't put a White Paper out on -- and I hate to jump forward --

CHAIRMAN ANDERSON: Yes?

MR. RUTHERFORD: -- but one issue was the neutron issue that was brought up.

CHAIRMAN ANDERSON: Yes.

MR. RUTHERFORD: If you remember, one of the questions that was brought up was whether we could say that workers were potentially exposed for the 2,000 hours; is that sufficiently accurate or is that way too high? Are we giving people too much time, which is throwing the neutron dose out?

And what we committed to, we would go back and do additional interviews. We interviewed three additional individuals who specifically were working with the enrichment, enriched material. They indicated that the six to eight hours of their day was spent working with enriched material, which ultimately kind of followed with what we gave them. So, we really felt that, based on that, that the 2,000 hours that we were giving them was good.

DR. MAURO: Okay. Yes, then we were looking at too much.

MR. RUTHERFORD: Yes. That is exactly what you were looking at, yes.

MR. KATZ: So, that sounds plausible?

DR. MAURO: That is plausible.

CHAIRMAN ANDERSON: Yes.

MR. KATZ: So that issue is closed?

CHAIRMAN ANDERSON: Yes.

DR. BEHLING: Can I just make a comment? This is Hans again.

I think this last one with regard to thorium does point out an interesting discrepancy where it was acknowledged that for thorium we used the 95th percentile distribution as a constant for operators. This comes in the same document that involves the other issue of uranium. And so, I am not quite sure I understand why we would not want to use a 95th percentile value in Table D-1

just to be consistent.

DR. NETON: We are looking into it, Hans.

CHAIRMAN ANDERSON: Okay.

DR. NETON: One thing I --

CHAIRMAN ANDERSON: Yes, go ahead.

DR. NETON: It is not clear to me whether that issue that Hans just discussed was considered at the end of the day to be an SEC issue or a Site Profile issue. I thought John thought it was. Hans, I am not sure where you came --

DR. BEHLING: No, I fully agree with John; it is not an SEC issue.

DR. NETON: Okay. Sure.

DR. BEHLING: It should be a TBD issue.

DR. NETON: Well, the reason I am asking is because we certainly will address it. But when it becomes a Site Profile issue, all the SEC issues that we need to follow up on will move to the top of the list for our

efforts.

CHAIRMAN ANDERSON: Yes.

DR. NETON: I mean, we have to prioritize things somehow.

DR. MAURO: I know I find myself sometimes in the embarrassing position where I say something is not an SEC issue. I know there are many Members of the Board who really don't make that distinction.

I don't know if I am overreaching, but very often just saying let's put that in the parking lot and we can make our decision based on this, I am not sure if all Board Members would agree.

DR. NETON: Well, I think what happens, though, is when the Working Group provides their report to the full Board, they put it all there --

DR. MAURO: Yes.

DR. NETON: -- what was discussed and how they weighed-in on each of the different issues.

DR. MAURO: Yes.

DR. NETON: At least that is the way it normally works.

DR. MAURO: I'm sorry, I only say that because, if it turns out when you do appear before the Board --

DR. NETON: Right.

DR. MAURO: -- I understand they will be at this meeting -- the degree to which you could -- anyone who may have concerns along those lines, if you have some answers by that time --

DR. NETON: Right, right.

CHAIRMAN ANDERSON: And they will have to address this window, a two-year window.

DR. NETON: Yes, that's true.

CHAIRMAN ANDERSON: Can that be dose --

DR. NETON: We will look at it.

CHAIRMAN ANDERSON: And that is where we need --

DR. NETON: But, like I say, there are competing other SEC issues that are still on the table that we need to prioritize those first. We will work this issue.

CHAIRMAN ANDERSON: I didn't know if there were -- I don't think there are any --

MR. KATZ: So, we don't have any more, we don't have any SEC issues per se left unclosed, do we? Or have I missed some?

DR. NETON: I don't know.

CHAIRMAN ANDERSON: I thought these three papers covered the areas that we had questions or we wanted elaboration on. And I think we have --

DR. NETON: Yes, fair enough.

MR. KATZ: Yes, I mean, notwithstanding John's comment.

CHAIRMAN ANDERSON: Yes.

MR. KATZ: So, if we have another Work Group meeting prior to not this Board meeting, which it is not on the agenda, but

the next one, we can wrap up --

CHAIRMAN ANDERSON: Yes.

MR. KATZ: -- the matter that has been opened about the two-year period --

CHAIRMAN ANDERSON: Yes.

MR. KATZ: -- that has remained open. And then, you would be ready to report out?

CHAIRMAN ANDERSON: Yes, I think so.

MR. RUTHERFORD: One other thing, I want to have time to have that interview.

MR. KATZ: Oh, absolutely, that should definitely come in advance.

MR. RUTHERFORD: He may provide me information --

CHAIRMAN ANDERSON: We are not done today.

MR. RUTHERFORD: Right.

DR. MAURO: If there is any vulnerability, when I heard the item plant -- I never heard of it before -- the first thing

that comes to mind, I always think of these boxes. I said, wait a minute, is this a box where we are missing data, whether it is bioassay or it is air-sampling data, and are there other practices and operations?

And I have to say that when SC&A was reviewing this, I don't believe we did any interviews. I'm not sure. We didn't, and I'm surprised. I don't know why.

And usually, that is the kind of probing we do. Are there any places where there is a surprise? So, this is a very important opportunity to close that hole.

MR. RUTHERFORD: Yes, I agree. I agree.

MR. KATZ: Yes, and they will coordinate with you on this.

DR. MAURO: Yes.

CHAIRMAN ANDERSON: And if, on the basis of the interview, it would be worthwhile to go back or do additional --

MR. RUTHERFORD: Additional work,

right.

CHAIRMAN ANDERSON: -- we can consider it at that time.

MR. RUTHERFORD: Sure.

MR. KATZ: Oh, absolutely. Absolutely.

CHAIRMAN ANDERSON: Yes.

MR. KATZ: But if it opens questions, then --

CHAIRMAN ANDERSON: Exactly, yes.

MR. KATZ: Right.

CHAIRMAN ANDERSON: Okay. So, we have really got two things we are going to try to iron out the baseline information on, the two years, as to how this is dealing with just the operators.

DR. NETON: The 95th percentile --

CHAIRMAN ANDERSON: Yes, yes.

DR. NETON: -- or 50th percentile.

CHAIRMAN ANDERSON: Yes, so that's an issue that we will discuss at the next meeting.

Then, next would be the interviews, which you should be able to get done before too long. And how we can report out those, I don't know.

MR. KATZ: So, we will have a Work Group -- I mean, if these are it --

CHAIRMAN ANDERSON: Yes.

MR. KATZ: -- a Work Group teleconference.

CHAIRMAN ANDERSON: Yes.

MR. KATZ: It just depends on the rest of the items.

CHAIRMAN ANDERSON: Yes, yes.

MR. KATZ: Electro Met, you know, once they produce a report --

CHAIRMAN ANDERSON: Yes.

MR. KATZ: -- they are going to report out to the Board. Electro Met is under the Work Group. They could report out to the Work Group, either way, the Evaluation Report. And then, it is just a timing question really.

DR. NETON: But the Board would

have to take up the vote.

CHAIRMAN ANDERSON: Yes.

MR. KATZ: Oh, yes.

DR. NETON: I mean, we have already presented this to the Board one time.

CHAIRMAN ANDERSON: And they moved it to us.

MR. KATZ: No, I understand.

CHAIRMAN ANDERSON: And then, we were going to come back, and then this --

DR. NETON: Well, I think this would proceed similarly to what Linde is doing.

CHAIRMAN ANDERSON: Yes, exactly.

DR. NETON: We would provide you the revised Evaluation Report.

CHAIRMAN ANDERSON: Yes.

MR. KATZ: Right. That is what I am saying.

CHAIRMAN ANDERSON: Yes.

MR. KATZ: So, if we have a Work Group meeting in advance, once that report is

produced, we can take up that report in the Work Group meeting. You will still present to the full Board, absolutely.

CHAIRMAN ANDERSON: Yes.

MR. KATZ: But the Work Group can then be ready to address the Board on that topic, is all I am saying.

CHAIRMAN ANDERSON: Yes.

MR. KATZ: So, that is Electro Met, United Nuclear; we have these open items. And then, we are going to hear about Baker-Perkins.

CHAIRMAN ANDERSON: Yes.

MR. KATZ: But this is not an SEC. This is Site Profile review.

CHAIRMAN ANDERSON: Site Profile, yes.

Okay. Shall we just keep going?

DR. MAURO: Baker-Perkins, that is next. That's not going to take long.

CHAIRMAN ANDERSON: Okay. So, I think we have got our work list.

MR. KATZ: Yes, and it sounds like, then, we probably can meet by teleconference the next time --

CHAIRMAN ANDERSON: Yes, yes.

MR. KATZ: -- is my guess.

CHAIRMAN ANDERSON: Yes. Unless this new one that you sent in --

DR. MAURO: Well, Du Pont we haven't talked about.

CHAIRMAN ANDERSON: We haven't talked about that.

DR. MAURO: We may want to; just as a reminder, we have had Du Pont since August. When you have a chance -- I don't know if you have looked at it, but it is there. It is not a lot. It is an AWE that is straightforward stuff. No big surprises. We should be able to deal with that easily.

CHAIRMAN ANDERSON: Okay. So, let's do Baker-Perkins.

Bill, any other comments on what we just talked about or United Nuclear issues

that you think you would like to see prepared before our next meeting?

MEMBER FIELD: No, I think everything has been covered pretty well.

CHAIRMAN ANDERSON: Good.

Okay. Take it away.

DR. MAURO: Baker-Perkins, okay, Baker-Perkins is one of the simplest. There is a five-day period where they were asked, the company, to do a special project for the government to use a kneading machine. It is almost like when you do dough, when you knead dough, automatically some kind of machine.

And apparently, they ran some five days' worth of experiments. And they collected air sample data and breathing zone data. So, they have got data on the airborne exposures that workers during those five days might have experienced.

So, this is just a Site Profile review. It is not an SEC.

CHAIRMAN ANDERSON: It has moved

out of 6001.

DR. MAURO: Oh, a little bit of a history.

CHAIRMAN ANDERSON: Yes, sure.

DR. MAURO: We did do a review of it originally way back when it was part of 6001.

CHAIRMAN ANDERSON: Yes.

DR. MAURO: Then, when it was extracted, it became a standalone document. We reviewed it as a standalone document and issued that review in November, just this month. So, it is relatively recent.

And I guess all we can do is pass on to you two comments, two findings. They are troubling, but nothing monumental.

One is you have all these data, breathing zone, general air sample data, and you have these workers. And you have elected to say, well, what we are going to do is assign the 50th percentile -- this is a 50th percentile issue again -- to the workers, the

argument being that there was knowledge that they wore some type of respirator protection, some kind of mask, nothing sophisticated, to reduce the dust.

And on that basis, the judgment was made that, well, because of that, we don't have to go with the 95th percentile; we will go with the 50th percentile as the dust loading that these workers that worked during those five days would be exposed to.

So, in a funny sort of way, you are sort of taking credit for respiratory protection in order to knock down the amount taken in. And usually, you don't take credit for respiratory protection. So, that was the first comment, which is pretty straightforward.

Everything else about your calculations, your geometric means, I mean all of your data processing, we matched and agree. It is how you use the data is the issue.

The same thing goes -- and I am

almost done -- with external. We agree with the radiation fields that you calculated external to these drums. And I guess the only strange question we have is, apparently, there were two drums that were produced, that were handled. And when you did your dose calculation, you did it only as if the person was standing next to one drum as opposed to two drums.

So, those are two. We have a number of observations, which are just clarity comments, just to make things clearer. I am not going to go through the observations. Those are just things that could clear up the explanation.

So, the two questions are: the 50th percentile dust loading, and the second one, when you do the external dose, you know, the business of external exposure to a single drum rather than two drums, which could increase the dose a little bit, nothing great.

And of course, the overriding

thing is you will be sorting people, I believe, by their job categories. As always, we always are a bit concerned that that is sometimes hard to do. A person is labeled as a laborer or as a supervisor or the different categories, or an operator, and then on that basis you decide whether you are going to -- the way you guys have done it is that, for the operators, we are going to use the breathing zone data as the basis for the exposure and go with the 50 percentile. For the laborers, you assume it is a mix of breathing zone and general. And for supervisors, you are going to go with only general. All of which, in principle, makes lots of sense, but in practice sometimes you can run into trouble.

Again, this is purely a Site Profile. There is nothing about this -- and even if it was an SEC, there would be no SEC issues. You know what I am trying to say? So, these are just classic Site Profile issues, and our report is relatively -- well, zoning,

there probably should be, but those are the two findings that we had.

I don't know if you guys have had a chance to think about it or what your position is, but that is Baker-Perkins.

CHAIRMAN ANDERSON: I mean, with five days --

MR. ALLEN: Well, that is almost the point.

CHAIRMAN ANDERSON: Now you get to 225 days for --

DR. MAURO: That's right. There is no SEC because --

CHAIRMAN ANDERSON: So, there couldn't be.

DR. MAURO: Of course, of course, of course.

MR. ALLEN: The TBD didn't go into a lot of great detail. We didn't think we really needed to for this operation.

What there is as far as information on this, I mean, it is a five-day

thing. It was really more like two days of actual testing of this Ko-Kneader.

There is a test report out that gives actually second-by-second, not just minute-by-minute, listing on what they were doing while they were running the Ko-Kneader for each of the three tests, the day, what was going on, including the rate, the rate of dry material coming in and the rate of the mix coming out.

Between the times and the mix, you can find out how much material they had. It was one drum.

DR. MAURO: One more drum? Okay.

MR. ALLEN: The one to two drums came from a FUSRAP document that said, based on the air sample data sheets, there could have been one or two drums or it might have been up to two.

DR. MAURO: Okay.

MR. ALLEN: But, also, from the air samples, they have dates and they have

times on most, but they are all sequentially numbered. So, you can get, between these two, a pretty significant timeline on exactly what was going on, when they were scooping, when they were running the Ko-Kneader, when they were deconning. And you can almost come up with essentially daily weighted averaged.

What I am proposing, that this is not -- if this is all right with the Work Group, that I can put together some sort of White Paper to put this stuff together. It can answer the findings, I think, like the one drum, the submersion dose, the --

DR. MAURO: Well, erase the submersion dose question.

MR. ALLEN: Okay.

DR. MAURO: I mean, that should have never have made it in there. That is not an issue.

CHAIRMAN ANDERSON: Yes.

MR. ALLEN: And as far as distribution for the operators as far as what

they were actually doing, you know, you can come up with an airborne concentration. You had three different air samples while they were scooping. You can come up with airborne concentrations while the Ko-Kneader is running, and you can come up with airborne concentrations while they are deconning, and, essentially, come up with somewhat if a time-weighted average.

It is applicable to a very small number of people, like one or two, probably one scooping, two or three deconning type of thing, and compare that with the TBD, and just deliver this White Paper to the group.

CHAIRMAN ANDERSON: That sounds good, yes. Yes, don't --

MR. ALLEN: Go hard-core into it --

CHAIRMAN ANDERSON: Yes, I don't think it needs to be too extensive. If you can respond, that would put it on the record, so we would have it closed out.

I am assuming we haven't any claims from here, have we?

MR. RUTHERFORD: Have we what?

CHAIRMAN ANDERSON: We haven't had any claims?

MR. RUTHERFORD: Yes, we have had claims.

CHAIRMAN ANDERSON: Oh, we have. Okay.

MR. RUTHERFORD: Yes. Only a few. It might have hit double-digit.

CHAIRMAN ANDERSON: Okay.

MR. RUTHERFORD: I don't recall.

MR. KATZ: Okay. We might even close out a TBD. That would be an unusual --

(Laughter.)

CHAIRMAN ANDERSON: Yes. Well, you know, I think if we can respond --

MR. KATZ: Yes.

CHAIRMAN ANDERSON: -- it will be a nice, relatively-tight package; it would be helpful, unless -- I don't know, do we have

any petitioners on the line?

MR. KATZ: Do we have any petitioners or interested parties on Baker-Perkins on the line?

(No response.)

MR. ALLEN: No, we don't have any petitioners.

MR. KATZ: Oh, no, not petitioners, of course. Sorry. Sorry.

CHAIRMAN ANDERSON: But if there is anyone, we should probably reach out, if we are going to potentially close this out, and be sure that if there are some folks, that --

MR. KATZ: Yes, that they are aware of it because we would know if there are any people that have been interested in Baker-Perkins.

CHAIRMAN ANDERSON: Yes.

MR. RUTHERFORD: Yes, the only person is the former petitioner.

CHAIRMAN ANDERSON: Yes, just so that they don't -- they wouldn't necessarily

be tracking this.

MR. RUTHERFORD: Right.

CHAIRMAN ANDERSON: Mostly, since it came up fairly quickly --

MR. KATZ: I think that is good, yes.

CHAIRMAN ANDERSON: Yes, let's just be sure that they have had a chance, before we say fine, that they have had a chance to look all this over and comment, and they haven't.

Okay. Bill, any comment?

MEMBER FIELD: No. I would just echo what you just said.

CHAIRMAN ANDERSON: Okay. Thanks, Bill.

MEMBER FIELD: You're welcome.

CHAIRMAN ANDERSON: Any other issues or comments that people have?

(No response.)

I think we have got our Work Group plans. Any ideas when some of this will be

done?

February is our next meeting?

MR. KATZ: So, the next full Board meeting is at the very end of February.

CHAIRMAN ANDERSON: Okay.

MR. KATZ: So, I guess we can shoot for getting this stuff done in the January or early February timeframe.

CHAIRMAN ANDERSON: Yes, I think that is reasonable, yes.

MR. KATZ: Then, that will work out, and we can have a teleconference before the full Board meeting.

CHAIRMAN ANDERSON: Yes.

MR. KATZ: We can put those items on the agenda.

CHAIRMAN ANDERSON: It would be nice if we could have it early enough so that there is time for the minutes to be transferred onto the website for the folks.

MR. KATZ: Oh, yes, the minutes -- oh, for the Work Group, the last

teleconference?

CHAIRMAN ANDERSON: Yes.

MR. KATZ: That can be difficult because that's generally --

CHAIRMAN ANDERSON: Yes.

MR. KATZ: I mean, sometimes they are much quicker, but it is up to 30 days.

CHAIRMAN ANDERSON: Yes. Okay.

MR. KATZ: And it has to be cleared before it goes on the website. But we will do our best on that. It is just that it is hard because folks have use-or-lose in the federal system.

CHAIRMAN ANDERSON: Yes. Yes, I've got it.

MR. KATZ: So, December is a tough month.

CHAIRMAN ANDERSON: Yes.

And back to the Hooker issues, was the 2009 review that Hans did, was that cleared? Were we talking about any documents --

MR. KATZ: All the documents are all up.

CHAIRMAN ANDERSON: Okay. I just want to be sure that we haven't been talking about documents here that petitioners or the public haven't had access to.

MR. KATZ: Right.

CHAIRMAN ANDERSON: And then, it comes back later -

MR. KATZ: Right.

DR. MAURO: I was referring to the memo regarding the data where it details --

CHAIRMAN ANDERSON: Yes, yes.

DR. MAURO: I don't know if that has been cleared or not.

MR. KATZ: That's cleared.

CHAIRMAN ANDERSON: Good. I thought it was, but since we go in, I don't necessarily know.

MR. KATZ: Right.

CHAIRMAN ANDERSON: I want to be sure that they are all up-to-speed.

MR. KATZ: No, that is taken care of.

CHAIRMAN ANDERSON: Okay. With that, I think we are good to go.

MR. KATZ: We are adjourned?

CHAIRMAN ANDERSON: Any other comments people have?

(No response.)

Hearing none, we are adjourned.

MR. KATZ: Thank you, everyone who has been with us on the line.

(Whereupon, at 11:57 a.m., the meeting was adjourned.)

1