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ADVISORY BOARD ON RADIATION AND
WORKER HEALTH

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ROCKY FLATS WORK GROUP

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TUESDAY,
MARCH 17, 2015

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The Work Group convened in the Brussels Room of the Cincinnati Airport Marriott, 2395 Progress Drive, Hebron, Kentucky, at 9:00 a.m., David Kotelchuck, Chair, presiding.

PRESENT:

DAVID KOTELCHUCK, Chair
R. WILLIAM FIELD, Member*
WANDA I. MUNN, Member

*Participating via telephone

ALSO PRESENT:

TED KATZ, Designated Federal Official
TERRIE BARRIE*
BOB BARTON, SC&A*
JAMES BOGARD, ORAU Team*
ELIZABETH BRACKETT, ORAU Team*
RON BUCHANAN, SC&A*
JOE FITZGERALD, SC&A
ROSE GOGLIOTTI, SC&A*
JENNY LIN, HHS*
JOYCE LIPSZTEIN, SC&A*
JOHN MAURO, SC&A*
JIM NETON, DCAS
JUDY PADILLA*
LaVON RUTHERFORD, DCAS
MUTTY SHARFI, ORAU Team*
DAN STEMPFLEY, ORAU Team*
JOHN STIVER, SC&A*

*Participating via telephone

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

(9:01 a.m.)

MR. KATZ: Good morning, everyone on the line, in the room. This is the Advisory Board on Radiation and Worker Health Rocky Flats Work Group, and we are ready to get going.

A couple of preliminaries. For this Work Group meeting, there is an agenda and related materials. They are all posted on the NIOSH website. You find them on the Advisory Board section under today's meetings, so go there and you can follow along with the materials that we will be discussing today.

Okay. And roll call.

(Roll call.)

Much thanks, and, Dr. Kotelchuck, it's your meeting.

CHAIRMAN KOTELCHUCK: Okay. Well, as folks know, Mark --

MR. KATZ: Griffon.

CHAIRMAN KOTELCHUCK: -- Griffon has -- thank you -- has left the Board to follow up and

work full-time on his Chemical Safety Board appointment. So I have been appointed -- newly appointed as chair of this Working Group. And also, Dr. Field, who is on the line, has been added to the Working Group. So the two of us are relatively new, and we are going to have to depend significantly for our other Board Members with long experience -- Wanda Munn and Phil Schofield, who is not with us today.

So we have the agenda posted on the DCAS online. Let's talk -- let's start out -- so folks see it, there are seven points. Let's start out first with a brief overview on the petition status. LaVon Rutherford.

MR. RUTHERFORD: All right. I'll give a brief overview, and then I will let Joe Fitzgerald with SC&A kind of add things that I will surely leave out.

We received the petition. It has been quite some time. I actually forgot to look at the date that we actually received the petition, but we issued an evaluation report back in December

2012. We initially identified that there was no SEC classes. We had identified the tritium issue associated with tritium exposure or that had -- an incident that had occurred in the 1973 timeframe, and potential exposure to tritium is our basis for qualifying the petition.

After some additional discussion, review of documents, and interviews that we conducted, we ultimately went back and we revised our evaluation report recommending a Class up through 1983. That recommendation centered not on tritium but on potential exposures to thorium, neptunium, U-233 exposures were the main items that drove the SEC Class.

After we made that recommendation, and the Board concurred with that recommendation, we identified that there -- we would continue to evaluate neptunium and look at the potential exposures to neptunium 1984 through 1989 period.

We also ultimately, through additional discussions with the Work Group, we identified that we needed to go back and do some additional research

on magnesium-thorium alloy. There were open issues with tritium that had not been resolved, so those were three open issues.

Additionally, the petitioner provided -- identified a potential issue with the health surveillance document that -- potential concerns with our ability to reconstruct doses because of that report. And then we also identified a potential exposure with the critical mass laboratory, and questions were brought up on data falsification as identified during the FBI raid. So these were the main six open issues that really kind of stayed open and have been -- we have been working through.

We have had a couple of Work Group meetings. We initially put out a White Paper on the tritium exposures. SC&A responded. We revised and did some additional update, and then SC&A provided another response back in September. So tritium exposure is something that we are definitely going to talk about today.

We also completed and issued a White

Paper on the health surveillance document. That will be the first item we will discuss after this. We have put together a White Paper on where we feel -- the activities with neptunium and any potential exposure past 1983, and later on, at the end of the day, I will give updates on two remaining White Papers that we are going to develop, and that is data falsification/destruction, and a lot of that is centered on the FBI raid period, and also exposures from the critical mass laboratory.

So, again, six open issues. We will discuss four of those today.

Do you want to add to that, Joe?

MR. FITZGERALD: I think that covers it pretty well. I would say that, you know, we have been addressing at least some of these issues from back when we did the original SEC review back in 2007 I guess with magnesium-thorium. We have participated with NIOSH in a lot of the early data captures, almost -- most of the interviews actually covering all of these issues pretty much, and have responded to all the White Papers, save one, the

most recent one, which is neptunium. And that's actually in a final version as far as the response goes. It is not issued, but we certainly can speak to that today. So I think we are prepared to respond to pretty much all of these issues.

So I guess with that I will turn it back to Dave.

CHAIRMAN KOTELCHUCK: Okay. Very good.

Well, let's -- first, before we get started on the health surveillance document review discussion, just to note for people online that we are changing the agenda slightly such that we will deal with the tritium issues, Items five and --- item five right after lunch, and then we will return to the agenda as posted online.

So let's start with the health surveillance document review.

MR. RUTHERFORD: Okay. I believe the health surveillance document is out on the website and available to everyone to review, and hopefully Bill -- Dr. Field, I apologize -- hopefully you had

a chance to take a look at that. I know you are going to be getting yourself up to speed with everything.

I will give you an overview of the document, and then our conclusion.

The petitioner -- well, the White Paper was developed in response to the petitioner's concern that dosimetry records cannot be relied upon for dose reconstruction. This issue was in response to -- the petitioner refers to the Oak Ridge Institute for Science and Education document Health Surveillance of Rocky Flats Radiation Workers. In that, it indicates that approximately 10 percent of the former workers were found to have received internal exposures higher than reported in the health physics record.

So there was a concern that because the health surveillance document identified that exposures were actually higher than previously identified by the site that this brought into question our ability to reconstruct doses for the workers.

Taking directly from that report, the report says approximately 10 percent of the 1,164 participants for whom a dose assessment was performed were determined to have some unrecorded internal dose, and approximately five percent of the participants had a significant unrecorded dose. So, again, this brought up the issue that -- of concern that would affect our potential -- or affect our ability to reconstruct the dose.

Back in SEC 30, we actually -- the evaluation report actually looked at the worker recall monitoring program, which was part of this --

CHAIRMAN KOTELCHUCK: Just as a question, on that piece of data on the 10 percent that had significant unreported dose, how was that determined in that original paper? That is, how did they know what the original dose really was?

MR. RUTHERFORD: Well, additional bioassays were taken as part of -- of some of the workers. So they actually took the bioassays --

CHAIRMAN KOTELCHUCK: Bioassays.

MR. RUTHERFORD: -- versus the -- right.

DR. NETON: If I recall, these were more sensitive bioassay measures.

MR. RUTHERFORD: Yes. And I was going to get to that.

DR. NETON: Okay. I'm sorry.

(Laughter.)

MR. RUTHERFORD: No. That's okay.

CHAIRMAN KOTELCHUCK: Okay. But I just -- and as I'm relatively new to this committee, I am going to ask maybe perhaps a few more questions.

MR. RUTHERFORD: Sure. That's good, you know, that --

MEMBER MUNN: That's all right. It helps bring us up to speed, too.

CHAIRMAN KOTELCHUCK: Good.

MR. RUTHERFORD: You know, it will be -- usually it's nice to be able to get a lead in. It helps me.

CHAIRMAN KOTELCHUCK: Okay.

MR. RUTHERFORD: All right. So, again, they looked at this back on SEC 30, and taken from the SEC 30 or Rocky Flats evaluation report: bioassay results from recall programs can help refine estimates of dose from internally deposited radioactive materials. However, the ability of NIOSH to perform dose reconstruction is not predicated on the continuance of such programs.

So, again, this was looked back at early on, actually under SEC 30. So we went back and we looked at the report again. We also, you know, looked at some of the reference documents as well. And when you review the report, you can see that the apparent difference in dose from the early years and as -- and primarily the results are based on a difference in the detection limits. So the minimum detectable activity for bioassay samples.

So the ORISE health surveillance report, it is taking the original site calculated doses and comparing them to recalculated external and internal dose based on new bioassay data from the medical monitoring program as well as from the

neutron dose reconstruction project.

The report finding that the internal exposures are higher than reported in the health physics record reflects the lesser sensitivity of the detection limits. So when workers were resampled during the medical monitoring program, the sensitivity of the more recent bioassay was much better. Therefore, it is not surprising the intakes were not detected.

Okay. The second observation, there are two additional differences between the doses assigned by either the historical site program or the health surveillance program. Under EEOICPA, we assigned this dose. Okay? That's something that is not done, you know, normally at a site, so -- which accounts for any limitations in any analytical measurements by -- you know, by calculating the maximum dose it could have been gone undetected.

Also, we assigned dose based on co-worker studies. So if we have unmonitored workers that, you know, did not get monitored

during that period, we look at those individuals, where they worked, the different -- you know, what groupings that they might be working in, and we can assign co-worker dose based on that.

So our conclusion was that the surveillance report does not indicate that the internal monitoring program was inaccurate. Our processes assess reliable and usable data to account for all potential exposures and determining bounding intakes, including unmonitored exposures through potential co-worker models.

Therefore, the conclusion is that all potential dose is accounted for, and the findings of the health surveillance report do not impact the ability to reconstruct dose with sufficient accuracy.

So, again, the main item was detection limits during those early years when new, more sensitive equipment that we have now allowed for -- you know, was the main indicator of the missed dose, or of those exposures being higher.

And that's it for that document. I'll let SC&A respond. I know that --

MR. FITZGERALD: Questions? Thank you, LaVon.

Actually, we've come across this issue once or twice before, so this is not an uncommon question, but we wanted to look at this de novo. And Ron Buchanan, who is sort of an internal dosimetrist by background, is on the phone. And, Ron, can you walk through your analysis?

DR. BUCHANAN: Yes. This is Ron Buchanan, SC&A. LaVon gave a good overview of what took place, so I won't go into -- repeat that. What we did is we went back and reviewed NIOSH's White Paper of May of 2014 to determine exactly what was done and how they handled the situation.

And we -- I do the auditing of the dose reconstruction cases, so I was familiar with how they processed their cases and how they did their calculations. And I can confirm that the way they do their dose assignments for internal doses does not depend upon the plant calculating doses in the

worker's files.

Now, what this consisted of, some of the DOE sites did have a program which projected out what the dose would be to major body organs when a person would have a whole body count. The person would have a whole body count, they would go in and project what the dose might be to their organs, not that they have the answer or anything, just what they might be for that worker at that time.

And many of these were zeroes because the detection level was fairly high in the older days. And what this -- NIOSH handles this by assigning a dose for that -- those zeroes, actually, a missed dose. And so this would actually result usually in a favorable dose assignment as compared to if they were surveyed with any more sensitive method, which ORISE used in later times.

And so we did not see a conflict. These are sheets of calculations in the workers' files. They are not actually used for dose reconstruction, especially those that read zero. NIOSH goes back

and uses the raw data from the actual detector printouts as opposed to a pre-set program and calculated dose back at that time.

So we did not see a conflict there with the way it is presently done under the Act, and would not indicate that the ORISE doses were better or assigned more dose than what the NIOSH would in dose reconstruction.

I would like to make a correction. In the revising of our statement we issued March 2nd, in the first paragraph, last lines, the reported dose should be -- should read "reported doses in health physics records," not the professional journals, not in Health Physics Society Journal. This got inserted and it shouldn't be, so it should just be -- read "higher than reported in the health physics records." That is called in the -- in the workers' files was the health physics records.

And so that's what we -- the concern was, and we did not see that this conflicted with the way the dose reconstruction is performed by NIOSH at this time.

CHAIRMAN KOTELCHUCK: Okay.

MEMBER MUNN: Ron, this is Wanda. Has that clerical error been corrected in the master copy?

DR. BUCHANAN: No. Unfortunately, it was issued that way, and we will have to go out and revise that.

MEMBER MUNN: All right.

CHAIRMAN KOTELCHUCK: Okay.

MEMBER MUNN: That's what --

DR. BUCHANAN: I want to clarify that. The actual records referring to was the health physics records in the DOE files, not a journal.

MEMBER MUNN: Yes. Thank you. It's a nice net to keep your eye on, though. Thank you.

CHAIRMAN KOTELCHUCK: And the concern that was raised in the petition was with respect to that 10 percent data, with the Oak Ridge data, but that -- we're saying that, and SC&A is agreeing, that the measurements are made based on the data collected, and they are not on any estimates from the plant.

MR. RUTHERFORD: Yes. Well, what we're saying is that we will take the intakes or the bioassay data and the external monitoring data. We will make corrections based on detection limits, based on limitations that we know with this, and ultimately we don't -- we don't take a dose that is identified in the record and say, "Okay. That's the dose that we are going to apply in dose reconstruction." We actually go back and adjust it based on our internal procedures.

CHAIRMAN KOTELCHUCK: Right. And that includes missed dose and --

MR. RUTHERFORD: Correct.

CHAIRMAN KOTELCHUCK: Okay. And MDA. When were the -- just because I'm, again, relatively new, when were the actual evaluations or dose reconstruction -- we have been dealing with SECs, but a lot of dose reconstructions have happened. When were they done? What year? We're talking about 2007, something like that, or 2004?

MR. RUTHERFORD: They have been, I

mean, all the way back since '04, '03, but we have -- you know, and what we do, I mean, as you know, our process, I mean, as we get our claims in, we will reconstruct it dose-based -- or reconstruct the claimants based on existing TBDs and stuff that we have. And as a TBD is revised, we will determine whether a Program Evaluation Report will determine whether we have claims that need to be pulled back and redone to -- based on additional exposures that we identified in a revision.

So that process continues on, and so what will happen after the -- when they completed the evaluation report, discussion on SEC 30, we went back and we made changes to the Rocky Flats Technical Basis Documents, and then we continue to make changes based on, you know, programmatic changes within different things, you know, technical information bulletins. And then after we get done with this evaluation report and we revise -- or we resolve all of the issues, ultimately the TBDs will be revised again. And so -- which could drive additional claims coming back

into ---

CHAIRMAN KOTELCHUCK: And, in particular, with respect to instrumentation, the MDAs, they have been lowered over time. Maybe not in this -- maybe not in this last decade, but over the years, and those are taken into account.

MR. RUTHERFORD: Right. And, you know, I think if you look at -- we have looked back at the analysis techniques that occurred all the way back, and we come up with detection limits based on those techniques, and then we use -- we take that into consideration for dose reconstructions for those time periods. And then, as we get new claims in for later years, those MDAs are adjusted to what analysis techniques they are using today.

CHAIRMAN KOTELCHUCK: Okay. Fine. So the MDAs at that time.

MR. RUTHERFORD: Right. Yes.

CHAIRMAN KOTELCHUCK: Okay. Good. Good.

MR. RUTHERFORD: So, Jim, you can feel free to add --

DR. NETON: No, I think we've got --

CHAIRMAN KOTELCHUCK: Yes? So basic agreement.

MR. KATZ: Bill -- do you want to just check with Bill Field? Are you --

CHAIRMAN KOTELCHUCK: Yes.

MR. KATZ: -- square with this, too?

MEMBER FIELD: Yes. I just had a question for LaVon.

LaVon, how was it, I guess, figured out or determined that the bioassay data was complete?

MR. RUTHERFORD: I'm confused here. What do you mean, how was it determined it was complete?

MEMBER FIELD: I guess the source that you are using now will be the actual bioassay data, right?

MR. RUTHERFORD: Correct. Yes.

MEMBER FIELD: Okay. What I mean is was there reported doses that there is not bioassay data for.

MR. RUTHERFORD: Well, yes, there -- I

mean, there is -- again, there are unmonitored individuals that we know, I mean, had to -- that occurred, but we take that into account with the co-worker models, you know, for individuals during that era. Is that what you're asking me?

MEMBER FIELD: Yes.

MR. RUTHERFORD: Okay.

DR. NETON: Also, we did capture the medical monitoring data --

MR. RUTHERFORD: Yes.

DR. NETON: -- and I believe they have been placed in the individual files, so they're there. But those results, since they were done with a lower limit of direction, would only serve to lower the dose calculation.

MEMBER FIELD: Right.

CHAIRMAN KOTELCHUCK: And the co-worker data is calculated in each building or, I mean --

DR. NETON: No.

CHAIRMAN KOTELCHUCK: -- I know that background issue, and I know you've talked for

years about --

DR. NETON: Well, the current co-worker model is the general co-worker model for all monitored workers. It fits a single distribution.

CHAIRMAN KOTELCHUCK: Right.

DR. NETON: But those will be reevaluated in light of this new implementation guide that we are going to talk about at the Advisory Board meeting.

CHAIRMAN KOTELCHUCK: Okay.

DR. NETON: There are some more prescriptive criteria now that we have to go through to demonstrate that a one size fits all model is appropriate, and, if not, it will be broken out, probably not by building but by different --

CHAIRMAN KOTELCHUCK: Division, whatever.

DR. NETON: -- different worker -- construction trades versus routine workers. That sort of thing.

CHAIRMAN KOTELCHUCK: Okay. Thank

you.

DR. MAURO: This is John Mauro. A quick question, Jim. So what I understand is the new draft co-worker model that we met on a week ago or so under the -- I guess it was the --

DR. NETON: SEC Issues Work Group, yes.

DR. MAURO: Yes. So that is a very -- by the way, everyone agreed on the phone that it was quite a comprehensive document addressing lots and lots of the nuances associated with co-worker models.

Did I just hear that you will be going back to not only this particular application of the co-worker model -- of course, it has been around -- these issues have been around for a while, but is there going to be a PER, for example, a series of them, that are going to be needed in light of this what I would consider to be a fundamentally much more comprehensive vision of the co-worker models?

DR. NETON: Yes. Well, yes, but it depends. If it turns out that some of the models

need to be stratified, we will do that and issue a PER. I'm not convinced that all cases that is going to be appropriate. Certain sites like AWEs maybe not, but, yes, we are going to -- we intend to do that once we -- hopefully we can get the full Board to accept the current draft model, and we will issue it probably early April and start moving our way through the files. It is going to take some time. We can't do this immediately, but that's our intent.

DR. MAURO: Thank you.

CHAIRMAN KOTELCHUCK: All right. So I think it sounds -- Wanda, do you have any comments or thoughts?

MEMBER MUNN: No. No. It's clear to me that the workers are being well represented here, and that everyone is having the kind of coverage allowed to them that gives them more than the benefit of the doubt in most cases.

CHAIRMAN KOTELCHUCK: Okay. I think we are -- if all agree, I think we are finished with this item.

MR. KATZ: Let's close it.

CHAIRMAN KOTELCHUCK: Let's close it. And, let's see. We'll go on to the next item, which was -- which is the magnesium-thorium issues.

MR. RUTHERFORD: All right. Well, the magnesium-thorium alloy issue has been around a long time. Actually, magnesium-thorium alloy, we issued an 8314 SEC evaluation report for the Dow Madison site a considerable time ago. And that Dow Madison was the producer of magnesium, one of the producers of magnesium-thorium alloy. Also, Dow Midland did that as well.

So magnesium-thorium alloy has -- drove that SEC or the production of a magnesium-thorium alloy drove that SEC. During interviews and discussion with Dow Madison workers, one worker or group of workers identified that magnesium-thorium alloy was delivered to -- or sent to the Rocky Flats plant, at this time -- at the time we were going through the Rocky Flats evaluation, so there was a considerable amount of work to go back and look at that.

And it was driven for a couple of reasons, not only the exposures from magnesium-thorium alloy. You know, the thorium in it is low percentage, two to three percent of thorium, but the driver -- there was also a driver under the covered facility portion of Dow Madison.

If they could show that a magnesium and thorium alloy was used in nuclear weapons, then it becomes a covered exposure, and it also changes the covered period. So Dow Madison's site had an ending of a covered period I think in 1970 at the time, and so the petitioner for Dow Madison took a lot of effort to see if they could show that magnesium-thorium alloy was used in nuclear weapons.

Ultimately, it was determined that it was used in -- it could have been used in some weapons, and the exposures at Dow Madison were -- from magnesium-thorium alloy, were considered covered, and they extended the covered period up to 1973.

While one of the concerns was if the

magnesium-thorium alloy was used at Rocky Flats in weapons production, you know, could this extend that even farther beyond the -- extend the Dow Madison covered period even farther. And are these exposures covered under the current -- I mean, are they -- have we evaluated those exposures? All these questions came up.

So some initial work that went on under SEC 30 and the review of documentation, and also interviews, they found no corroborating evidence for the assertion that magnesium-thorium alloys were used or present at Rocky Flats during -- or at Rocky Flats.

And I actually interviewed Rocky Flats personnel to see if one of them were aware of the receipt of these types of materials, and none were aware that magnesium-thorium alloy was ever present or used in any significant quantity. The actual interview -- the person that was interviewed from Dow said, you know, a truckload of material being sent to Rocky Flats, which is a considerable amount of magnesium-thorium alloy.

The issue came back up -- it was considered closed, and the issue came back up under this current SEC when a petitioner was -- she was approached by a former worker who wished to remain anonymous, and I will state this is from email. "Earlier this month, a former Rocky Flats worker related to me through a third party information concerning the use of magnesium-thorium alloy plates at Rocky Flats. You may remember that Dow workers submitted affidavits that Dow shipped these plates to Rocky Flats.

"The information relayed to me was they were brought in on the 903 pad to 881 to refine them, sent to the mod center for modification to fit semi-trucks as to make them bulletproof.

"The semi bed was brought in, stripped down, and the sheets were refined to help armor plate the trucks." And then it goes on.

So because that issue was brought back up, we went back and we did additional interviews. We actually -- I talked to a person that was at the Board meeting at the time who was involved in this.

We set up classified interviews at the Denver records facility. We interviewed four to five, or it may have been -- you know, four to five workers that were directly associated with this work.

And we also went back and we did additional data captures and research to see if we could find documentation on -- potential documentation that would show that magnesium-thorium alloy was used at the mod center.

From that review, from the interviews of the workers, and from the review of documentation that we had there, we found no indication that magnesium-thorium alloy -- we had no corroborating evidence that it was used at Rocky Flats. But through that research we also identified that Sandia National Lab may have been involved in the process, since they were part of the design team, and putting together for the mod for the semi-trucks.

So we went back to Sandia National Lab. We did a data capture search there as well. And, again, we found no information that supported that

magnesium-thorium alloy was used at Rocky Flats.

So, in summary, that's it. In summary, to date, we have found no evidence that supports that magnesium-thorium alloy was used at Rocky Flats. And that's it. I'll turn it over to SC&A.

MR. FITZGERALD: Okay. As LaVon was saying, this has a long history. I think this stemmed from a 2007 interview that we had recently conducted with a worker at Dow Madison, and, again, that was the first indication, and we have been following up ever since then, actually. So this does have, in fact, a long history.

At the time, there was some debate about whether that worker or workers may have gotten the destination for the mag-thorium wrong, because, again, I guess the Rocky Mount arsenal and Rocky Flats have some similarity in terms. But having been involved in that particular interview, it was a very clear answer, so it was certainly compelling enough that we wanted to make sure that due process -- we looked at documentation and talked to additional people.

Mag-thorium -- I think one of the key issues that would concern us at this point is mag-thorium did have some wide application in the weapons complex in that timeframe. I'm working in the Kansas City plant SEC at this point in time, and mag-thorium figured in Kansas City all the way up to 1979, in terms of actual handling.

So as far as timeframe and significance, Kansas City used it. We know it has application in the weapons program. Rocky Flats, Sandia, Kansas City, Los Alamos, were all key components of the weapons complex under the Albuquerque Field Office. So, you know, this question of whether any of these facilities were actively involved in that application is a valid one.

So certainly when you look at it from that standpoint, we have some specific comments, and that's in our response. But certainly the different specifications for the shipments, we felt there were a few more that needed to be addressed and searched against in terms of shipping

records, and we identified those. These came out of the interview with the Dow Madison work originally.

The other issue is I think there was -- and we participated in the NIOSH data capture at the Legacy Management Complex in Denver, and I think all of us recognize that the set of records that Legacy Management had there that we were searching for, and we have certainly looked at the issue of mag-thorium in those records, was incomplete. I would say significantly incomplete, because Los Alamos apparently had come down, to some of the chagrin of the managers at the LM facility, and took quite a few Rocky Flats records, a lot of classified records that had relevance to the weapons program.

And, understandably, they were concerned about these records. Given the status of Rocky Flats having been closed, they wanted to take these records back and bring them back to Los Alamos and retain them there. So, you know, this issue was raised at our full Board meeting in

October 2013. There were a number of boxes of Rocky Flats records at Los Alamos, which is not surprising. I mean, I think, again, it was recognized they took a lot of records.

So it does leave some question of whether, you know, mag-thorium would figure in those records, since it was an aspect of the weapons program in terms of processing.

Another issue is -- and I think this has turned out to be a fairly good tool, all of us have looked at the NMMSS, the nuclear material inventory, as a source of confirmation as to what strategic materials, you know, in fact are in place at different DOE facilities at different timeframes. And this has served to be a -- it is kind of a tool to verify, you know, what's being held.

And at least in Kansas City certainly we saw magnesium-thorium show up as an alloy thorium entry. We did the same thing for Rocky Flats for mag-thorium and did not find anything. But I want to caution, because we did actually talk

to the DOE managers who manage the NMMSS program, and, you know, they basically took what the sites gave them. You know, they just kind of compiled it, summarized it, and certainly whatever the site provided is what they used.

And it is very possible that Rocky Flats, given the source terms they were dealing with, which, you know, plutonium, neptunium, and uranium, that mag-thorium probably almost didn't get on their screen. So it could explain why we didn't see it there, although we did see it at Kansas City, because, again, the difference is that they had very few radiological source terms. They, in fact, did list thorium as one of them, even though it was very slightly contaminated.

So, in general, you know, we have not found much in the way of records for mag-thorium. Otherwise, this issue would have been gone years ago. We have had to rely on interviews of workers, mostly to discount the original input that we got that in fact Dow Madison has shipped it. And we haven't found any corroboration of that at all, so

it sort of leaves us in this situation where we don't have any records per se, any clear-cut closure on the thing from that standpoint.

We have sort of a disparate collection of interview inputs, most of which say, no, Rocky didn't receive it. We have one that says Rocky was sent it. So it's -- we are sort of at a point now where, no, we don't think it's conclusive, but on the other hand, short of trying to track down within Los Alamos' voluminous pile of records the boxes that might, and may not, contain mag-thorium, we are sort of at that point where I think the Work Group would have to consider if the search should go on.

I mean, I think, again, we are at that point where we have talked to a lot of people, we have chased down a lot of leads. There may in fact be some additional records at Los Alamos to validate this. And, certainly, the history of mag-thorium use suggests that it is possible that there was an application at Rocky, but to date we have not been able to verify that.

So I think just trying to put all of that on the table is kind of where we are. We can continue looking, but given the cycle time that we have had with Los Alamos for the last three or four years, it could be a pretty lengthy search, quite frankly. So --

MR. RUTHERFORD: Let me add something, too.

MR. FITZGERALD: Yes.

CHAIRMAN KOTELCHUCK: Sure.

MR. RUTHERFORD: I also want to point out that -- and I think Joe had -- I don't know if you mentioned it or not, but I know that the SC&A's paper mentioned it, and I think ours mentioned it as well, the magnesium-thorium issue and the time period is within the current SEC period at Rocky Flats. So this issue would only be from exposures to potential -- for partial dose reconstruction.

MR. FITZGERALD: That's correct.

MR. RUTHERFORD: All right. I just wanted to make sure everybody is aware of that. It has no -- the time period does not reflect -- or

would not extend beyond the current SEC.

MR. FITZGERALD: Even if one would conjecture that given the Kansas City experience, the mag-thorium could be around through '79, that still would pre-date the '83 SEC cutoff. So the context is certainly of partial dose reconstructions only.

CHAIRMAN KOTELCHUCK: This issue will come up again -- does come up again in the tritium, that much of the issue that we're dealing with is covered by the current SEC, except for partial dose reconstruction.

I don't have any feeling for how many people either have already filed claims that would call for a partial or -- and how many -- if one has any sense of how many there might be in the future. Let's first talk about the past claimants.

MR. RUTHERFORD: Well, I'll let Jim jump in.

DR. NETON: It has been our experience -- I think it was holding fairly consistent that about 60 percent of the cases go SEC. If an SEC

is made, it covers about 60 percent of the cases we had in-house. So that leaves about 40 percent that would come in through what we call the non-presumptive cancers, you know, or they meet other eligibility criteria.

Of those cancers, the non-presumptive cancers, you know, have things like skin cancer, prostate cancer, organs that don't typically have much dose associated with the inhalation of things like uranium. So I'm not saying it's zero, but the dose would be pretty small. It is never a good idea, I don't think, though, to sort of couch whether we do something or not because it won't affect many people, because if I'm that one person affected, you know --

CHAIRMAN KOTELCHUCK: Of course.

DR. NETON: -- but the reality of it is that it wouldn't affect like almost any cases. Doesn't mean it wouldn't -- it would be zero, though.

CHAIRMAN KOTELCHUCK: Right.

DR. NETON: Because, like I say, once

you get into reconstructing doses for particularly this thorium alloy, which is typically around two to three percent thorium by weight, so it's a trace contaminant, that's probably not --

MEMBER MUNN: So this is a larger issue, really and truly. It's not how many would be affected; rather, how likely would this particular single incident that we are talking about affect any individual given the low number of actual thorium molecules that you are dealing with here. It's really very, very slight.

Add to that the fact that you have no reassurance from any of the interviewees who were in that very limited space at that very limited period who can or will say, "Sure, we had a project like that," which seems unlikely. You have a small team that works that particular very specific area, and they don't have indication that they were ever involved in that particular kind of activity would lead one to believe that the confusion about where that shipment went was a natural one that could occur for anybody. It seems unlikely.

CHAIRMAN KOTELCHUCK: Yes.

DR. NETON: You also have to consider, even if this were shipped to Rocky Flats, what would they do with it? And the only way one would be -- generally any significant exposure was to do some sort of grinding/cutting operation on a material that generated airborne source term. We don't know that that --

MEMBER MUNN: And the airborne source term would be very, very small.

DR. NETON: It would be very small, because it's mostly magnesium, not thorium.

CHAIRMAN KOTELCHUCK: And the concern raised by the petitioner was from a person who said they were using it for plating --

MR. FITZGERALD: Yes.

CHAIRMAN KOTELCHUCK: -- for bulletproof plating.

MEMBER MUNN: They said it was sent for that purpose. They were not at the other end, so they don't know where it went and what happened to it. They said it was sent for that purpose.

CHAIRMAN KOTELCHUCK: But the concern -- but the recent concern is from a worker at Rocky Flats who was using it presumably, or had heard --MR. FITZGERALD: Right. And it was unnamed source, but the interviews were directed at folks that had worked in that facility to see if there was any knowledge of --

CHAIRMAN KOTELCHUCK: So one might simply have cutting -- I mean, some machining --

MR. FITZGERALD: Cutting, welding.

CHAIRMAN KOTELCHUCK: -- fitting to size.

DR. NETON: That's what confused me a little bit is magnesium-thorium, I'm not sure of its application in bulletproofing. Normally, when you think of that, you think of depleted uranium or something like that.

CHAIRMAN KOTELCHUCK: Right. Right.

DR. NETON: The properties of magnesium-thorium -- I could be wrong, but I'm not familiar with how that was used in --

CHAIRMAN KOTELCHUCK: I do remember as

a citizen reading about the period in the -- was it the Iraq war where there was suddenly felt a lot of people were getting hurt by bombs, and there was a big move to get -- that there was not enough bulletproofing, and that there had to be a lot, and they used depleted uranium, but I wouldn't be surprised if something else would work.

DR. NETON: Yes, I don't know.

CHAIRMAN KOTELCHUCK: So it's credible that --

DR. NETON: It's possible.

CHAIRMAN KOTELCHUCK: -- that it could have been used.

DR. NETON: Sure.

CHAIRMAN KOTELCHUCK: Tell us about -- in light of what Wanda said, tell us about the persons who were interviewed for this. I mean, basically, we got a worker report -- I don't know that the person is even a worker. It's a third party. So we have an employee at the plant, and how many -- I mean, you gave a number of four, five, and then apparently, Joe, you also did some further

interviews?

MR. FITZGERALD: No, no. We actually did a joint one.

CHAIRMAN KOTELCHUCK: Okay. Great.

MR. FITZGERALD: This was a very specific allegation that was at a particular facility, whether that particular facility, the mod facility, had received and used these plates. So the idea was to talk to folks that would be familiar with that timeframe and that operation, to see if they recollected it.

CHAIRMAN KOTELCHUCK: And it was -- I mean, what's really very -- I mean, there would have to be transport into the -- you know, receipt, transport, but the folks who are really "working with it," that mod facility, how many people worked at that mod facility in that kind of operation? Not that you had to interview all, but just give me a sense, if you would.

MR. FITZGERALD: It was 30, 40, 50. It was a decent-sized operation. They did the SSTs, the safe transport vehicles that the complex used.

So they were plating -- you know, putting armor plating on those. Not necessarily with this material, but the question was whether they were using this material, but they certainly were doing that as a mission.

CHAIRMAN KOTELCHUCK: Since I noticed that the petitioner was -- that they were part of a union, the Steelworkers Union, would you say that the people that you interviewed were -- included members of that union as well as managerial folks? Was that -- I mean --

MR. RUTHERFORD: Yes. It was mainly the workers that we talked to, and we talked to one or two -- I think there was one of the managers involved there.

MR. FITZGERALD: There was a mix.

CHAIRMAN KOTELCHUCK: Okay. Because --

MR. RUTHERFORD: But it was mainly the workers.

CHAIRMAN KOTELCHUCK: I mean, one might think something that could come in under the

radar, if you will, people down absolutely in the field would know or might know what they handled as compared to a person higher up in authority, who, you know, you give directions. If you're in authority, you give directions and you figure they're carried out by competent people.

MR. FITZGERALD: Now, the only cautionary note on this is we went through the same kind of probing at Kansas City, for example, and the way a lot of work was done at the -- in the complex back in that timeframe, it was very compartmentalized as far as what you were working on. The average worker would not necessarily know what he or she was working on for classification reasons.

CHAIRMAN KOTELCHUCK: Sure.

MR. FITZGERALD: So, you know, sort of a grain of salt caution, because sometimes asking a worker, "Did you work, or did you no work, with magnesium-thorium?" I'm not sure whether you would necessarily get an authoritative answer just because in a lot of cases they went right into that

material they were working on.

CHAIRMAN KOTELCHUCK: Fair enough.

MR. FITZGERALD: So that's just -- just would add that as a side note.

MR. RUTHERFORD: I agree with that caution, but I do -- one of the workers was pretty definitive in his statement that, you know, he would have known if there was magnesium.

Now, I don't disagree with Joe at all. I think Joe is absolutely right. So, you know, whether he was definitive on his own, you know, or he -- but there was one worker who was pretty definitive.

MR. FITZGERALD: And then this is the -- sort of the thrust of our comment, that, you know, we have been sort of compelled to use interviews in this process, because the documentation just -- I think everybody's hope was that you would find something that would clear it up in writing in a record. And we haven't been able to do that, except, you know, we looked at shipment records and we didn't see anything in the shipment

records, which I think is helpful, and --

MEMBER MUNN: On either end.

MR. FITZGERALD: Yes. I mean, yes.

MEMBER MUNN: On either end. That's key.

MR. FITZGERALD: And when you get into the interviews, I think you are looking for corroboration. And I think we sort of got a corroboration that nobody raised their hands and said that, yes, we have it.

So it's -- some of it is sort of a annulled feedback, but I think that's pretty much all we have been able to get. And I think that is helpful, and I think that is what we are bringing back to the Work Group. We have not been able to corroborate any magnesium-thorium at Rocky Flats through these various inquiries, and we haven't seen anything in the records. So there we go.

CHAIRMAN KOTELCHUCK: And I have to say from my own -- myself that reading through what NIOSH -- its records search, its search, seemed to me pretty comprehensive. I was impressed at the

number of different ways one approached trying to figure out if something was sent, transport, receipt, different ways, and they found nothing. It's hard to believe. If these are metal plates, right, that's -- somebody would have noticed metal plates coming in, and, as you noted, in fairly large weights, right, and sizes.

MR. RUTHERFORD: Yes. That was the Dow Madison indicator was that it was a significant --

MR. FITZGERALD: And I would also add -- again, I keep bringing up Kansas City because we are doing that there, but we did not find any issue with establishing receipt of mag-thorium in Kansas City at all. And it showed up in operational records as well as inventory records.

So it would be a puzzler with the asterisk being, you know, I'm not sure Legacy Management had as complete a record set as we'd like, but it would be puzzling if there wasn't any record at Rocky Flats of receipt, just because we saw it fairly extensively at Kansas City.

CHAIRMAN KOTELCHUCK: Right. Right.

MEMBER MUNN: Well, and the number of shipments was not just one every once in a while. The number of shipments out of Dow Madison was significant, several a month, three or four a month, something like that. And they wouldn't -- none of them say that they are going there. So it doesn't follow. It just doesn't.

CHAIRMAN KOTELCHUCK: Yes. Although I did note in the record that [identifying information redacted] had 11 affidavits from folks at Dow Madison that they sent things there. But it does seem hard to believe that we wouldn't have something in the records of a large number of shipments of heavy -- large heavy items.

MEMBER MUNN: Well, you realize that anyone educated and undereducated, and everybody in between, east of the Mississippi, does not know what exists west of the Mississippi. So if somebody says "Rocky" to you, you're immediately going to see the Rocky Mountains, and you're going to see some facility there.

CHAIRMAN KOTELCHUCK: Yes. Yes.

MEMBER MUNN: But the designation of individual smaller facilities, individual kinds of activities, would not be something that would, from my experience, be known by people, unless you are in that area, working in that area, and even then people don't make the distinction in their minds, especially if they are both defense facilities of some sort.

CHAIRMAN KOTELCHUCK: Yes. Yes.

Bill, do you have anything -- questions or comments or --

MEMBER FIELD: Yes. I guess those things -- in the SC&A report, there is a sentence that says, "However, it is within the Work Group's purview to judge whether further investigation is warranted." And I guess, you know, thinking about this, what is sufficient investigation? You know, what scope really addresses what is sufficient? It sounds like there is -- you know, they have gone back and done more interviews.

I guess if the committee would say,

"Yes, we want more investigation," I mean, what would you really investigate?

MEMBER MUNN: The only thing you could do is go to Los Alamos and spend six, eight, 10 months, two and a half years, trying to find in that set of documentation, which is staggering -- you know, they have taken over things, in my understanding, that otherwise would have been a part of the RIDS program. And so, therefore, you have multiples of the kind of paper information that you have at other sites.

So you would have to go and look through all of that hoping that you would find some indication that this particular shipment was received in that particular place, and you have no assurance that such a record ever existed or will exist after you have gone through everything that exists at Los Alamos. So this --

MEMBER FIELD: Yes. I agree with that, Wanda.

CHAIRMAN KOTELCHUCK: Yes. Yes.

MEMBER MUNN: It seems pointless. It

isn't as though this is a single rodeo. It isn't something that has been looked at, shrugged off, and said, "No, that can't be." It has been followed assiduously, not just for a few days but literally for years, and at two different sites. So from this Work Group Member, I do not see any purpose in pursuing this further.

MEMBER FIELD: I guess you could say you think there has been sufficient investigation.

(Laughter.)

MEMBER MUNN: I think you can probably say that with some assurance.

MEMBER FIELD: Okay.

CHAIRMAN KOTELCHUCK: Let me ask in this line, we have -- I'm still impressed by SC&A's comment that you -- that there is really a chance that it really did happen and that folks -- there were mistakes made. If that were shipped, if despite all of the lack -- with the lack of records, that it really was shipped, we are still talking about something -- a material with two or three percent thorium.

I don't know what kind of -- obviously, we have to know how -- if it came, how people work with it. But it would seem as if this was not a heavy exposure that people would get, even if they handled the plates. But the exposure would be -- and it would actually be on their badges.

MR. RUTHERFORD: Any external exposure.

CHAIRMAN KOTELCHUCK: The external exposure, right. Internal -- although to get internal exposure they would have to do machining --

MR. RUTHERFORD: But to be fair, the thought process was that they would have to make modifications to those plates to install them, and so there could have been cutting, there could have been grinding, and, you know, that would have driven some -- would have driven some exposures.

MR. FITZGERALD: The essence of it is we haven't established what the operational use of this material was, if any, at Rocky Flats. So before we could get to that question, we'd have to

establish that it was at Rocky Flats, and what the operational application was. And that is what -- the thrust of the research that was being done, and, you know, I don't -- actually, we framed it up, not too dissimilar to what Wanda was saying, that, you know, it is a question of how much it is worth in terms of resources.

The only -- again, the only pause I have is that when you do a records review, and you hear from the, you know, records manager that a lot of the records were, you know, swooped up and taken away, in this case by Los Alamos, after a closure then it sort of gives you some pause as to, you know, whether or not there is records or not.

And I would add that you mentioned [identifying information redacted] comments, and he filed a Freedom of Information request apparently of Los Alamos for magnesium-thorium as it was, and was told, you know, it was like something -- this was at our Board meeting a couple of years ago. There was something like 400 boxes at Los Alamos of Rocky Flats files, which sounds

pretty onerous to me.

But on the other hand, you know, it just leaves you some pause. That's why we're saying here we don't have any confirmation or corroboration or indication. But, on the other hand, I think the records review is a bit inconclusive given that. So it is a question of whether or not it is worth pursuing further.

CHAIRMAN KOTELCHUCK: I'm trying to think ahead. If this is sufficient, if the record search is sufficient, I'm thinking suppose we're wrong. Suppose it really happened. There is some credible evidence -- some evidence; I don't even say credible. Some evidence that it's -- that it happened, and we're wrong, this is not likely to have resulted in exposures that would be -- highly affect the dose reconstruction for the individuals. That is --

MR. RUTHERFORD: For the non-presumptive cancers.

CHAIRMAN KOTELCHUCK: Yes. Right.

MR. RUTHERFORD: Because the

presumptives are covered under the SEC and already included, so -- in the time period.

CHAIRMAN KOTELCHUCK: I mean, I agree with the others that maybe this really is sufficient, and that we really have done the best we could, short of going to Los Alamos. But we have tried many things.

MR. FITZGERALD: We have a collective wince at the thought of trying to get --

CHAIRMAN KOTELCHUCK: Right.

MR. FITZGERALD: -- records from Los Alamos.

CHAIRMAN KOTELCHUCK: And given that there are other issues outstanding, that we do need to resolve that are --

MR. FITZGERALD: This would have been a different discussion, I suspect, if we would have come to this point early in the process before the '83 cutoff. I mean, I thought -- I think it would have been a different discussion just from the standpoint of having to cross the T's that way.

CHAIRMAN KOTELCHUCK: Yes. Yes.

MR. FITZGERALD: I think we can divorce it from that context now.

CHAIRMAN KOTELCHUCK: I think that's true, and that most people -- for most people, well above 60 percent, it's resolved because they're in the SEC. So I'm ready to suggest for the committee that we do agree that it's sufficient, and I think maybe we should simply move that. Do other Work Group members agree?

MEMBER MUNN: I agree.

CHAIRMAN KOTELCHUCK: And Bill?

MEMBER FIELD: Yes. I agree.

CHAIRMAN KOTELCHUCK: Okay. And I agree. So I think we have resolved this to our satisfaction. And this will eventually, at some point, be reviewed by the Board, if they wish.

Okay. So now the neptunium issue. By the way, it's 10:00, but we started at 9:00, which is a little late for some of our meetings, so that's fine. People live here in town, and 9:00 is fine. But I don't see any need for a break or upcoming for -- it's early.

And so let's go to the neptunium issue and --

MR. RUTHERFORD: Okay. All right. White Paper is the evaluation of potential for internal dose from neptunium at Rocky Flats plant after 1983. And it's after 1983 because, again, the Class was added to -- up through 1983, and neptunium was one of the components of that.

Our White Paper summarizes our research on neptunium-237 processing at Rocky Flats after 1983. It includes discussions, operations, inventories, available monitoring data, and the evaluation for potential internal exposure after 1983.

I highlighted a number of sections in this report to kind of -- one, to get -- to remind people of some of the work that was done with neptunium, and also to kind of lead into -- as kind of our weight of the evidence of how much work after 1983 occurred.

There was a 1981 paper, Neptunium Processing at Rocky Flats, that states that process

included preparation of pure neptunium oxide, metal, metal alloys, as well as neptunium-237 recovery from a variety of residues.

If you look back at when we recommended the SEC Class and the reasons for that, our infeasibility, one of the key issues was pure neptunium. It was dealing with the exposures of, you know, you've taken a process, you've produced -- and you've made neptunium oxides, you've made different forms of neptunium in itself, and the inability to define the exposure won't -- not only from the neptunium that was produced, but also the controls that were in place at the time, and the lack of monitoring for neptunium at the time.

The processes employed included dissolution, anion exchange, precipitation, filtration, calcination, conversion to fluoride, and reduction to metal. So it was basically the whole metal fabrication process using different techniques of isolating the neptunium.

Neptunium was recovered from residual metals including sand, slag, crucibles, casting

skulls, and various alloys containing plutonium, tin, uranium, or zirconium. And this was -- this whole process was also in other documents that supported, you know, actinide processing at Rocky Flats.

So, again, all of those operations occurred 1962 to 1983. And when we initially went through this, all indications that we had indicated that processing of neptunium did not occur after 1983. So we went back -- and when we went back after committing to the Board that we would review the '84 to '89 period, we went back and did additional data captures. We also did additional interviews of individuals, and we did identify one operation that occurred in the 1985 period.

There was a -- the resultant effort had -- wait a minute. Okay. A single operation in a 1987 document, production scale, plutonium-neptunium separation and residue recovery at the Rocky Flats plant. So we identified this one operation, and we went back and we interviewed the actual lead engineer for this

project and a couple of other workers.

The 1985 operation involved the processing of plutonium scrap containing down to .5 percent neptunium to separate and recover the two metals. Feed material was roughly 63,000-64,000 grams of plutonium, and there was roughly 200 to 230 grams of neptunium. The separation process involved oxidizing the plutonium residue, passing through an anion exchange resin, and leaving neptunium behind for subsequent pollution, evaporation, denitrification, and calcination.

So actually you're asking -- the process was to purify the plutonium. The authors reported completion of 24 separations over the course of a year, resulting in purification of 58,000 -- roughly 58,000 grams of plutonium, and removal of 222 grams of neptunium.

Again, we interviewed the principal engineer who stated that project personnel consisted of roughly five experimental operators who performed the work in gloveboxes. So this was a very small process that occurred in 1985 period.

There were few individuals involved, and it was performed in a glovebox.

The final purified plutonium contained only .0069 percent neptunium, and so the neptunium product or the byproduct that was left over consisted of 14,000 grams of plutonium, 220 grams neptunium, neptunium ratio of -- plutonium to neptunium ratio of 6.4.

So what we looked at was -- a similar thing that we looked at with SRS was, one, you know, the small portion of neptunium that was actually left in this product would the plutonium actually dominate the exposure over the neptunium. Again, this operation involved no purified neptunium. The dose from the mixture making neptunium -- or, wait a minute. Sorry. The dose of internal exposure would have been dominated by the plutonium, making neptunium bioassay unnecessary.

Given the much greater specific activity of plutonium, plutonium bioassay would account for all organ dose. So, again, we went back. We looked at, one, the operation. We

identified that the operation that did occur, that was controlled, the -- it was controlled in a glovebox, and that all individuals that were involved in that were on bioassay program, were on the plutonium bioassay program, which the plutonium would have dominated any exposure that occurred during that operation.

We also went back and we looked at inventories of neptunium. Again, we looked at the NMMSS database of neptunium at Rocky Flats. If you go on to page 5 of the report, you know, the inventories, you know, as reported in, you can't really draw a conclusion as to how much work that occurred with neptunium based on the NMMSS inventory, because as we've seen actually in our early evaluation, fluctuations during a given year -- you know, and you could start with one kilogram, you know, and have operations occur in -- and you could have received material ultimately, and at the end of the year still end up with one kilogram and be reported in the NMMSS database.

So unless you have the details of the

actual incoming receipt of materials and the operations, you can't really get a true picture of this. But it does give you an idea, if you look at after 1983 you have a relatively -- the '83/'84 time period, you have relatively constant, I mean, inventory. And those people that we have talked to that work at MC&A, there is always minor corrections in stuff that go on with inventories.

So you will see some fluctuation, and you will see in a follow-on table, if you look at -- and I'll get to it, but there's a follow-on table that identifies receipt of materials, so there was some little bit of receipt of material that occurred, and there was some material that was sent from the site.

So let's go on. Also, we looked at the actual waste product. One of the indications that we had was that, yes, there was neptunium waste, a lot of neptunium waste, that could have presented exposures as well that -- in the later years.

Well, if you looked at the byproduct material or the amount of neptunium that was in the

waste, we went back and we looked at INEEL, which is where a lot of the waste from Rocky Flats went to. And you can see on page 6, Table 2, it presents measurements showing that drums containing neptunium-plutonium -- plutonium was also present, and the plutonium to neptunium ratio ranged from 105 to 6,450.

So, again, your neptunium was a very low -- small constituent within that matrix, and it -- the plutonium would have dominated exposures if it were actually, you know, processing these drums.

MEMBER MUNN: I think those tables are pretty clear. Orders of magnitude difference.

MR. RUTHERFORD: Okay. We also looked, again, at -- we looked at the monitoring that occurred. There was no -- if you remember back, we reported that we had two neptunium bioassay samples, and those were in the sixties. So there was no neptunium monitoring past 1983, but, again, we didn't expect neptunium monitoring because the one operation we identified, the plutonium would have dominated. And so as long as

the individuals were on plutonium bioassay, they were covered.

We all looked at workplace monitoring. There was no additional workplace monitoring for neptunium-specific. But I think the biggest thing is the containment measures that employed during neptunium operations. One of the other reasons that we identified the Class early on was not only a potential exposure from the pure neptunium, but we had indications that early processes were not necessarily contained.

We did get the -- we identified the 1981 document that identified additional controls that had been in place, and it wasn't clear when we did the original evaluation when those additional controls went into play. So ultimately we -- you know, we pushed it out to the 1983 period, but it is clear from this 1981 report that the neptunium processing that occurred later years was done in gloveboxes.

And according to the principal engineer who designed the processing and directed

activities, the operation -- that later operation in 1985 was performed in gloveboxes and tanks. So that was consistent with a 1981 report that we reviewed that identified neptunium operations were performed in gloveboxes as well as that 1985 activity that occurred.

We have identified no radiological incidents involving neptunium after 1983. We also looked at shipments, receipts, and you can see on page 8 that no material was received for -- neptunium received after 1986, and from 1983 to 1986 there were very small quantities that were received from -- some from SRS, ORNL, and Lawrence Livermore.

CHAIRMAN KOTELCHUCK: That's in grams.

MR. RUTHERFORD: Yes. That's in grams. Those are in grams. Okay.

And you can see on the Table 5 on page 9 that the shipments from Rocky Flats are very low as well after 1983. In fact, after 1986, there were extremely small quantities, and up until 2002 and 2003, which is -- which we have presumed final

inventories were shipped out.

Okay. So, again, we identified one operation after 1983 that involved purified plutonium with neptunium. And that -- in that operation, the most highly concentrated neptunium product produced by this separation was still mostly plutonium with a plutonium-neptunium ratio of 6.4.

And since the specific activity of plutonium is 90 times greater than the activity -- or the specific activity of neptunium-237, the mixture is greater than 500 times -- or the activity ratio of this is greater than 500. So, again, the plutonium would dominate all exposure for that operation.

So, in conclusion, we find no evidence that neptunium-237 intakes occurred at Rocky Flats after 1983. If intakes had occurred during this period from this single identified operation, the resulting organ dose would be adequately accounted for from the available plutonium bioassay data.

And that's it. I know Joe doesn't have

a report, but he's got a draft report that he can speak to.

MR. FITZGERALD: Before I jump in, any questions of LaVon or -- okay.

We reviewed both Rev 0 of NIOSH's report that came out December 30th, as well as Rev 1, which is dated January 8th. As LaVon noted, we do have a review completed, and it's in a pretty finished draft. It just has not been issued.

And we are also certainly aware of the exchange of emails from the co-petitioner and are familiar with some of those issues as well. And we can certainly speak to those later.

I'm going to just focus, since LaVon gave a pretty good summary of the NIOSH review and the analysis, just sort of our lines of inquiry. You know, we wanted to probe some of the premises on the NIOSH assessment and just make sure that we are comfortable with those.

And the first one was, is there -- was there only the single neptunium operation that was identified in place at Rocky Flats after 1983, you

know, the question of, you know, is there -- was there just one operation that actively handled neptunium and processed it.

And we participated in the onsite data captures that -- in 2012, and actually through 2013, looked for records on neptunium, and, frankly, looked for any source terms, any operational information for the entire period, both pre- and post-'83. And we looked at the SRDB references as well that were cited in the NIOSH review.

And certainly we did not see any evidence of an operation post-'83 in those. We did identify three additional SRDB documents that spoke to neptunium handling in the post-'83 timeframe. I want to go through those, because these are sort of additional documentation of the issue post-'83.

MEMBER MUNN: What was the reference of those documents, Joe?

MR. FITZGERALD: I'm sorry?

MEMBER MUNN: You said --

MR. FITZGERALD: I'm going to go through those one by one. Just for reference's sake -- and I'll kind of summarize those, since, obviously, you don't have those references.

But the first one is SRDB 130921. The second one I'm going to speak to is SRDB 138666. And the third one is SRDB 131225. I might add that I think in the NIOSH assessment they certain did capture the major ones. These are just additional ones that I thought were of interest.

SRDB 130921, the first one, is actually an interview with a former worker knowledgeable about Rocky Flats materials accountability. And the question was a fluctuation in terms of the material descriptions for neptunium that was part of the discussion. And while the individual could not be definitive about these differences in descriptions, this is sort of, you know, the classification that was being used from neptunium in this case.

There was a question regarding a small inventory of neptunium finished items reported in

1988. So this would fall in the post-'83 period.

And what was being spoken to at that point in time was an alloyed, finished, machined item, about eight grams worth, and an assembled product of seven grams that had been left over. And when we -- in this interview we are talking to the worker about what -- what are we talking about in the late '80s.

And what he was talking about in this case was, you know, at Rocky Flats they were a major source of neptunium for the complex, and they had this sort of cottage industry of producing different products. And certainly after '83, in addition to the one operation that LaVon was talking to, you will find neptunium showing up in the inventory at Rocky Flats, because they held on to materials. They received -- actually, received materials. These were components. These were finished alloys, pure metal material that was held, shows up in NMMSS, and it shows up in shipping records.

So this interview was a corroboration

that after '83 you did see neptunium coming and going and being stored at Rocky Flats. It just was in a finished form. They were no longer, apparently, fabricating or processing it.

So, you know, certainly from one vantage point was to validate the fact that, you know, even though you have neptunium being present at Rocky Flats in quantities after '83, the form of it and the handling of it was different than it was before the end of '83.

In the second interview, which was SRDB 138666, it was an interview with a former engineer at Rocky during the same years in question, and in this particular case the comment was that you had a considerable amount of former neptunium processing equipment abandoned in place, and that neptunium, including neptunium residues, were in the plant until site closure, until Rocky was closed for D&D, final D&D.

MEMBER MUNN: Residual stuff.

MR. FITZGERALD: Yes. And, in other words, the gloveboxes, the ductwork, you just had

residual neptunium in the plant.

The worker further observed that, and this is a quote, "Equipment that processed neptunium was left in place and not stripped out, and that it was stored in shape or form until -- on the site until site closure, and that Rocky was still shipping neptunium contaminated materials up to site closure."

CHAIRMAN KOTELCHUCK: Which was to --

MR. FITZGERALD: Which was 2003 was final closure. D&D was commenced, I think, in '91, 11 or 12 years before that.

But, you know, again, you had a situation where cleanup was progressing and waste materials were being shipped, in a lot of cases, to Idaho and so you had certainly neptunium-contaminated material that was being processed and shipped. So --

MEMBER MUNN: And very carefully monitored.

MR. FITZGERALD: Yes. So, anyway, this was -- this interview pointed out that when

D&D workers cut out the property, the equipment, and removed it, they became exposed to neptunium.

So, anyway, this was a commentary about D&D and waste management at Rocky Flats during the period when they were cleaning the plant up and closing it, and the fact that in the process it was likely there were workers exposed to neptunium. So that was the interview here.

And I want to point out that in that interview summary NIOSH did highlight its response to some of these issues, and I want to point these out for the record. While NIOSH -- and there are three bullets. "While NIOSH does not dispute the information provided in this response, the individual provided no dates or specific references to incidents or actions that could be traced or verified."

The second bullet is, "NIOSH is looking for information in the post-'83 period. Any discussions of the operations that occurred in the pre-'84 period would not be relevant.

"NIOSH does not dispute the potential

for personnel neptunium exposures in the post-'83 period. However, NIOSH contends that the exposure would be dominated by the plutonium. Nothing involved purified or pure neptunium, and nothing provided up to this point disputes that contention."

So, in that instance, we are talking about in D&D and waste management this was, again, plutonium and neptunium mixed, that the pure components, as referenced in that first interview, were kept in vaults, were handled as pure, and did not figure in the D&D and waste management as far as we can tell from these interviews.

The final point was really identifying additional people to talk to, but I think that was the essence of that second interview, that even though you had D&D and waste management actively happening, and you had certainly neptunium exposures, this was neptunium combined with plutonium that would have been the source term.

So, anyway, the third interview --

CHAIRMAN KOTELCHUCK: Were bioassays

going on in that --

MR. FITZGERALD: In the D&D phase, yes.

MEMBER MUNN: Absolutely. A lot of them. They were very, very closely monitored during that phrase.

MR. FITZGERALD: Yes. The D&D phase and waste management phase is one of sort of the modern era where you had active monitoring of bioassays.

And the third interview, this is 131225, this is a foreign technician performing facility hold-up measurements in the '90s. This is where -- sort of is in concert with D&D and closing the plant. They were looking for unaccounted materials that might have been held up in ductwork, in flues, and whatnot, gloveboxes.

And this review, which was facility-wide, found traces of neptunium in about 10 percent of Building 771 gloveboxes, and this was at levels relatively small compared to the plutonium present.

The interviewee believed that this was

neptunium that was likely separated prior to recovery streams, and there was no evidence that contamination spread. So this was within the gloveboxes themselves. But they were cutting up gloveboxes, so, again, as part of D&D, you know, there was certainly that exposure potential.

MEMBER MUNN: The process was very, very carefully controlled, as I recall.

MR. FITZGERALD: Yes. I'm still talking about the '90s and beyond, so this is a pretty controlled process.

MEMBER MUNN: They were really very careful to make sure that no exposure other than what was absolutely necessary inside the enclosures was --

MR. FITZGERALD: And these interviewees agree that neptunium remained at Rocky beyond '83, and into final cleanup, and that contaminated equipment, like gloveboxes and ductwork, had trace amounts of neptunium and would have undergone D&D.

However, none of the interviewees

identified any other operations involving neptunium, and no one cited processing of pure or purified neptunium would have had exposure potential.

So, really, to answer that very first question, you know, was there any more than the one operation post-'83 that was identified in the NIOSH analysis, looking at these additional interviews that were not referenced in the White Paper that NIOSH produced seems to bear out that no -- other than D&D and waste management that was handling commingled plutonium-neptunium material, and the inventorying and shipping of pure forms of neptunium. There was no other operation that was handling neptunium at Rocky Flats.

So the second question -- that was the first question -- line of inquiry. The second line of inquiry, was there any exposure potential associated with this one neptunium operation or from any other neptunium source terms?

And, you know, again, we looked at the interviews and looked at the documentation we had,

and the tanks containing the feed materials were located outside the gloveboxes. These were piped, as LaVon pointed out, directly into the gloveboxes. Recovered plutonium was piped as a nitrate directly to the production operation, so you had essentially a closed system for this one operation, the recovery operation.

The recovered neptunium nitrate was put into pencil tanks, converted to an oxide, and canned back out of the glovebox. The operation was monitoring by alpha air counters, and RCTs were positioned in the area.

There was one incident that I think was identified which was a leak from a feed tank of plutonium nitrate, but it was cleaned up and no exposure was reported as being associated with that one leak. So we are looking at the incident history for this one operation, and that was it, and there wasn't any identified exposure associated with that one instance. It was a minor leak from a valve on that tank.

At any rate, all workers in

Building 771 where this operation took place were on routine bioassay. So that's a pretty important factor as well. So the impression of -- essentially exposure potential, we did not see a routine exposure potential for the one operation, given that it was a closed system, and that -- and the one incident that did occur, there wasn't any uptake apparently recorded.

In terms of D&D and waste management, there was clearly exposure potential, but we didn't see any instances where that would have involved pure neptunium. So I think that distinction is important here.

The third line of inquiry was, was neptunium always present in combination with plutonium in this particular operation, or any other operation or source term identified? And I think basically we found that the PU neptunium separations work was effective at purifying both PU and neptunium, but as noted -- and I think and what LaVon was saying, it wasn't so perfect that you did not have sufficient plutonium to be

detectable through a routine bioassay.

So in this particular operation, as well as clearly in D&D and waste management, you -- at Rocky Flats particularly, you would always have plutonium with the neptunium, and that provides a marker, if anything, for the alpha analysis, the bioassay.

Were all workers having exposure potential from this one neptunium operation bioassay? Would those results encompass any intake of neptunium?

As I said earlier, all workers in 771, including this operation, were bioassayed, and all neptunium would have been associated with plutonium. So I think that is clearly an affirmative.

And in terms of the incident, there was the one incident involving Tank 1007, and this is in SRDB 138682, which is the incident report for that. And it involved a leaking valve, and no rad alarms were triggered, and no worker intakes were found and recorded on that particular instance.

It was cleaned up and that was pretty much it. We looked for more reports, did not find any more than that one issue.

And, finally, I guess, is it technically sound? This is a key issue. Is it technically --

CHAIRMAN KOTELCHUCK: Could I just before --

MR. FITZGERALD: Oh, sure.

CHAIRMAN KOTELCHUCK: -- on the leak, what did you say about the leak?

MR. FITZGERALD: Well, the leak -- like I said, there was an incident report on that. It was a valve of plutonium nitrate, and it was -- you know, it was discovered as a leak under the tank, and once it was discovered the RCTs supervised a cleanup, which was done without any intake. So there was no intakes by workers reported for that leak. And that was the only -- frankly, the only incident report we found for that particular operation. This is the one that we have been talking about.

CHAIRMAN KOTELCHUCK: That's right.

MR. FITZGERALD: And, finally, you know, this is I think an important question for the Work Group. Is it technically sound to rely on plutonium bioassays to account for any neptunium intakes that may have occurred during this timeframe?

And we reviewed the -- you know, obviously, the RFP documents, and particularly SRDB 137075, and that addresses the dominance of a specific activity of PU as compared with neptunium. And I think that was referenced in NIOSH's report. And we compared it against the legendary rad health handbook information, and some -- I thought there was a later edition, but that's the same edition I had back when. I guess it's so good you don't have to update it.

And Ron Buchanan did a lot of this analysis using the Chronic Annual Dose Workbook, the CADW. He does a lot of the DR reviews for SC&A, so it was particularly helpful for him to use those tools to double check on that analysis. And,

again, I think we would agree that the resulting neptunium dose is about equal to plutonium on the basis of dpm intake that would be 1/100 times less on a per mass basis. So, again, the specific activity is such that plutonium would clearly, clearly dominate.

So counting all alpha monitors as being plutonium appears to be claimant-favorable in this case, and I think -- you know, so the central thesis on this whole thing is if one could establish that there was one -- in fact one operation, and only one operation post-'83 that handled neptunium, and everything else was either pure -- in other words, handled in inventory as an alloy or a form, even if it was shipped, right? And there was no exposure associated with that, or as waste or D&D material, commingled with plutonium, which, you know, again, workers handling D&D would have been monitored. Then I think the use of the PU bioassays as dominant and applicable is okay from our standpoint.

That's pretty much where we are on that.

CHAIRMAN KOTELCHUCK: Okay. When were you -- when will you finish it, roughly?

MR. FITZGERALD: It's in final draft. I actually, you know, noticed in one of the co-petitioners' emails that there might be some potential new information presented at this Work Group meeting, and I wanted to be open to that, since we are at sort of juncture of issuing this. And if there were new information that would be relevant, I was going to include that analysis here.

But as far as the NIOSH White Paper, I think that by itself we have looked at, reviewed, and this is where we are, and we have that paper written, and it can be issued at any time.

CHAIRMAN KOTELCHUCK: Okay. Very good. And we will hear later from the petitioners and representatives later in the day. But any questions by our Work Group members?

MEMBER MUNN: None. Thank you for the overview, Joe. That's very helpful.

CHAIRMAN KOTELCHUCK: Yes.

DR. MAURO: This is John Mauro. I just have one question. It may add a little bit more. I understand when dealing with the inhalation of the plutonium that there is some serious levels of neptunium.

Just two questions. When it's inhaled, did the two radionuclides more or less travel together biokinetically and up in the same organs? And the second question, and this may go more towards Jim, when you are doing the dose calculations and you're assigning an uncertainty, very often I see very large sigma values associated with these exposures.

I think these are two questions that go toward the degree to which there is some separate concern that is needed regarding neptunium.

MEMBER MUNN: Yes.

DR. NETON: Yes. Well, this is Jim. Liz Brackett can probably answer better than I can, but I don't think the metabolic models are identical for plutonium and neptunium. There are some differences.

MS. BRACKETT: Right. They are different.

DR. NETON: Yes. So --

MS. BRACKETT: But that shouldn't have any impact at all on using a ratio, because we would just ratio the intakes and then use the individual models to calculate the doses with them.

DR. NETON: That's right.

DR. MAURO: Yes. And I agree with that, so it really -- I just wanted to get a sense for that, whether it did go separate paths. And how about this uncertainty? Because I know you folks often decide a fairly large uncertainty, which would certainly account for this relatively trace level.

DR. NETON: Well, all of the internal dose calculations have a GSD of 3 on them, if it's not a co-worker model. And then, if it is a co-worker model, it is even larger. But that's the default value. It's a pretty large, large --

DR. MAURO: Yes. I thought it was important to get that on the record to complete the

story.

CHAIRMAN KOTELCHUCK: Okay. Dr. Field, do you have any questions?

MEMBER FIELD: I guess the question, did I hear it right, or I may have missed it, there was about five workers involved with this process?

MR. RUTHERFORD: Yes. In the process that -- the one operation that occurred in '85-'86, yes, there was about five workers involved.

MEMBER FIELD: And they all have bio monitoring data?

MR. RUTHERFORD: Yes.

MEMBER FIELD: Okay. That's all I had.

CHAIRMAN KOTELCHUCK: All right. So I think we'll simply await the input from petitioners later in the day, and then expect to see it -- well, depending on what they say and whether there are things that need to be pursued, then we will see -- we will see the written document. And I don't know how the committee functions when that comes in.

MR. KATZ: The petitioners are on the line.

CHAIRMAN KOTELCHUCK: Okay. That's true. I'm actually not sure how to phrase this. What is the -- how does the -- how do members of the Working Group feel about the report, except for that, the issues that may come up later? That's -- there really -- there have been -- there has not been, among us, questions about that, concerns, or our concerns were answered that you responded to, and basically agreed with NIOSH, I think pending completion of the report and possible later data.

MR. KATZ: Yes. I think as we went through that analysis, I think Ms. Barrie brought up a question of duration of the '85-'86 operation, and the fact there was some ambiguity about how long it was. And I did research that. I can, you know, touch on that if you'd like.

The precise duration of the campaign and the start date was questioned in the emails, as we were saying, and, you know, in interviews you do get comments like began around -- and this is

a quote, "Began around January '85," "ended in '87," or "was terminated in '88," respectively, and I went through some of the interviews and just trying to -- you know, it's a valid question. I mean, how long was this thing?

And I think the recollections seem to be a little vague about dates, but you're talking 30 years ago. So it's not too surprising.

CHAIRMAN KOTELCHUCK: Right.

MR. KATZ: But I think there was -- some of the ambiguity came from the fact that the one individual who was managing this did not file a termination report for the operation. He was pressed to do so, because that I guess was a -- at Rocky was the documentation that an operation had officially ended, and he was delayed something like six or seven or eight months in actually providing that report.

So there is some fuzziness at the tail end of this thing as far as length, but I think it was pretty clear it was about roughly a year, maybe a bit longer, and as far as the recollections it

took them about six to seven months to officially terminate the program and write the report. So I think that explains some of it as far as that goes.

CHAIRMAN KOTELCHUCK: Perhaps as a senior Member, Wanda might suggest how we ought to proceed in the Work Group. I'm not quite sure --

MEMBER MUNN: Well, thank you, Dave.

CHAIRMAN KOTELCHUCK: -- how to proceed.

MEMBER MUNN: It is instructive sometimes to remind ourselves what we're trying to do here. And from my perspective, what we are trying to do here is to make sure that we have not overlooked any significant source of exposure for anyone who was ever employed at this facility. I can see no red flags having been raised in the process that has taken place with respect to neptunium.

It seems fairly clear that every effort has been made to identify any activity that might have gone on, any source of potential exposure from neptunium, and a fairly decent job has been done

of quantifying what that could have been. Our big question is always what is the maximum that could have occurred? I think that is fairly well in hand now, and it seems fairly sure that it is unlikely any major source of neptunium that could considerably increase any exposure has been identified now.

And since it has been identified and is incorporated as a part of the program, I don't think we can completely write off this issue until we have actually had SC&A's report in hand and taken a look at it. But from my perspective, unless something unexpected shows up in the final report from SC&A, we can put this to bed once we have reviewed that document and agreed that it is satisfactory.

CHAIRMAN KOTELCHUCK: Good. That answers one of my two concerns, which is that we need to see the document, but seeing that things are -- there is agreement and I'm comfortable with what the conclusions are.

The other part of it is if we said, "Well, something may come up later when the

petitioner speaks," then of course you will address that, if it needs further work. And that we can only say wait until it happens.

MR. KATZ: She's on the line. Do you want to consult the petitioner now? I mean, you don't have to put her off until the end of the meeting for comment. I mean, we do this all the time.

MEMBER MUNN: It seems it would be a good time to hear --

CHAIRMAN KOTELCHUCK: Is the petitioner on the line? Ms. Barrie?

MS. BARRIE: Yes. This is Terrie.

CHAIRMAN KOTELCHUCK: Would you be willing to address the issue of the neptunium or -- you were going to talk later at the end of the meeting today, and there is -- we expect that you will talk. But if there is a particular issue with respect to neptunium that you want to raise, would you be willing to talk about it right now?

MS. BARRIE: Yes. I am able to talk about neptunium. It is basically --

CHAIRMAN KOTELCHUCK: Good. Thank you.

MS. BARRIE: Thank you. Thank you. I was just writing you an email.

CHAIRMAN KOTELCHUCK: Okay.

MS. BARRIE: I'm not a scientist. This came from a former worker that has been interviewed I think a number of times by NIOSH and SC&A.

And one of the -- now, I'll just be reading this off his email.

CHAIRMAN KOTELCHUCK: Sure.

MS. BARRIE: One of the issues that NIOSH bases their model on, or their position on, is that protactinium was used to determine if there was neptunium at the site. And the worker wanted to know if they used U-238 or neptunium-237 as the isotope.

He also goes on to say Line 1 in Building 771 was the americium-241 production line. Americium-241 decayed into neptunium-237 by alpha decay at a rate of five percent for 22 years.

Rocky Flats produced one kilogram of americium-241 per year for close to 40 years, so 10 percent of 112 kilograms of americium-241 in 1998 was 11.2 kilograms of neptunium-237. He says that, "We had our own source of neptunium-237 and didn't even know it."

He is not sure that Line 1 was monitored for neptunium-237, and he wonders if the 60 keV gamma we were told was from americium-241 was really from neptunium-237.

He also -- this is the last part, and I'm sorting this out -- this has to be a discussion for NIOSH and SC&A and the Work Group because this is not my background. He found in Basic Radiation Protection Technology by Gollnick, it says that neptunium-237 produces a deep dose of 287 millirems per hour per microcentimeter squared at seven milligrams a centimeter, whereas plutonium-239 is zero, and americium-241 is 9.3 millirems per hour.

So I'm wondering, if he is correct, if using the plutonium for dose reconstruction is -- or the bioassay is really accurate.

And the other part that I want to mention is I need to remind everybody, just because there was a glovebox does not mean it was contained. I know Joe Fitzgerald mentioned that there was one incident of the tank leaking, but there is numerous accounts of gloveboxes leaking at Rocky Flats. So I would not make the assumption just because this process was in a glovebox that nothing leaked.

Thank you.

CHAIRMAN KOTELCHUCK: Thank you. Thank you. Any comment from --

DR. NETON: I think we are going to have to maybe -- I don't know if this is new information. We have not seen this email before. This is Jim. We certainly need to look at it, because there was a lot of technical numbers thrown out there that I couldn't follow on the top of my head.

I will say, though, the last comment on the seven milligram per square centimeter dose really, in my mind, relates to skin dose, not internal dose. So, yes, it's true that neptunium has a much higher penetrating gamma than plutonium,

so the dose -- external dose would be higher. But that of course would be accounted for in the dosimeters that the workers were wearing I think.

But we would still like to take a look at it. I can't comment off the top of my head on something as complicated as --

MS. BARRIE: Okay. I'll send those off to everybody. Thank you.

MEMBER MUNN: Yes. Thank you. I'd certainly like to see that.

CHAIRMAN KOTELCHUCK: Okay. So folks will take a look at that. Folks at NIOSH will take a look at that and at SC&A, and you will talk about it, and that plus the report will be written. And the report -- the part before Ms. Barrie spoke, there is agreement certainly from the Work Group. I shouldn't say -- I am in agreement, and Wanda has said she is in agreement. And, Bill, have you -- I believe you spoke also.

MEMBER FIELD: Right. I said I was in agreement as well.

CHAIRMAN KOTELCHUCK: Right. That's

what I thought, too. I just wanted that confirmed.

So this issue, except for that last item, is basically resolved, and we will either -- we can either handle it at our next meeting or possibly --

MR. KATZ: So, Terrie, if you will send your email or whatever that -- form that communication was to LaVon, then he can distribute it to me and I can get it to SC&A and the Work Group members as well.

CHAIRMAN KOTELCHUCK: Okay.

MR. RUTHERFORD: Yes. And I wanted to add something real brief. This is actually mainly for Dr. Kotelchuck and -- is to remind you that, you know, I know we have gone through all of this, and we've said we have identified no operations, and so on. At a later date, if the SEC is closed out here and we all of a sudden come up with a report that says uranium -- or that neptunium was processed in dah, dah, dah, dah, dah, that's new information and we can either -- if we determine there is an infeasibility, we can go through the

8314 process to add the Class.

So don't -- you know, I always want to remind everybody that just because we haven't found anything now doesn't mean if we find new information that we can say -- you know, we can go back to it. Okay?

MR. KATZ: Absolutely.

CHAIRMAN KOTELCHUCK: And which also means that claimants can later come up with information, because in some cases we have said do not continue to pursue searching the records for magnesium-thorium. But if somebody comes up with a record about that, and actually the 192 proposal exactly says that, no, I have some more information, and we are looking at it, and we have looked at it. Can't find it -- can't find backup for that documentation, I should say, for that.

It is there, and maybe more will come in, and we'll reopen it. Always reopen on new information, and that is important.

Okay. Well, folks, it is 11:00. We have, first, the tritium issue, which will take a

fair amount of time. And I am not sure -- I am open to suggestions on how to proceed. We can -- we have to break for lunch, but this is a little early. We could either start the discussion now until noon, break for lunch, and then come back, and then at that time -- it seems to me that's maybe the best way to go.

MR. KATZ: Can we have a comfort break, though? It's been two hours --

CHAIRMAN KOTELCHUCK: Yes. You're right, you're right. Okay. Let's take a short break, and let's get back together.

MR. RUTHERFORD: I was hoping someone was going to --

MR. KATZ: So we'll get back together in 10 minutes?

CHAIRMAN KOTELCHUCK: Right. Very good.

MR. KATZ: We're just putting the phone on mute, but we're not breaking the line.

CHAIRMAN KOTELCHUCK: Right.

(Whereupon, the above-entitled matter went

off the record at 10:59 a.m. and resumed at 11:18 a.m.)

CHAIRMAN KOTELCHUCK: Okay. On the tritium issue, LaVon.

MR. RUTHERFORD: Okay. I'm going to, basically, go through a little history, a little bit of, you know, where our report ended up. And then once I complete that, I'll turn it over --- answer any questions, and I'll also turn it over to SC&A for them to respond.

This is actually Revision 1, and I'll go through, again. Initially, when we issued our Evaluation Report, as I mentioned, tritium was the basis for qualifying SEC 192 for evaluation. And it had to do with whether the 1973 incident was clearly evaluated in SEC 30, and potential for tritium exposure and the lack of monitoring prior to that. So, we qualified the petition. Our initial Evaluation Report when we issued it, we identified that tritium dose reconstruction was feasible. We were, basically, using the 1973 incident as a bounding exposure. We used a lot of the dose

reconstruction that was in the report, the actual report of the incident, and we'd identified a bounding exposure I believe of 700 millirem from that incident. And we could use that to support all other operations.

The Board recommended at the time that we go back and do further evaluation. We committed to doing that, to doing additional interviews, also to do additional data capture. So, we had a follow-up. The follow-up was to clarify the existence of tritium on site and associated personal exposures, investigate tritium bubbler sampling, confirm the existence of shipping container tritium surveys, and also look at the sampling analysis of Building 123.

For our initial follow-up, we actually did some data captures at the Denver Record Center. We interviewed a number of individuals, a number of key individuals in classified interviews, and from those classified interviews we did identify the potential for tritium exposure from the receipt and opening of shipping containers.

We also confirmed that in documents. There were a number of documents that later on after the data captures, we did find other documents that indicated that potential, as well.

We went back during that process, and we also looked at ways that we could potentially refine our previous analysis since it was pretty much tied solely to the incident. We went back to look and see if we could find additional survey information, additional information on the bubblers that were identified. One of the interviewers identified bubblers back in the earlier years in the '60s at the exhaust plenums, and we went to try to find additional data on those bubblers, what type of bubblers were used, do we have any additional information that would corroborate they were actually used earlier years?

We also looked at the post-'73 monitoring data. We went back to see how much data we had, what the data was telling us for the tritium monitoring data, the incidents -- any incidents that occurred post-'73, or even pre-'73, and we

--- all of this was in an attempt to, one, make sure that, one, we identified all our sources of tritium exposure, and that we --- to see if we could refine our analyses a little bit.

If you look in our report on page 4 there's a follow-up --- you can see the follow-up information in that on tritium bubblers. You can see the table of the different items that --- on Table 1 it identifies all the different SRDB numbers associated with the tritium monitoring, and the tritium bubblers for the period.

What we found was pretty much pre-1973, there was very little data associated with tritium monitoring. We had a couple of ----- we had a few bioassay samples, but nothing that really identified a strong tritium monitoring program prior to 1973, which is consistent with what we had actually found in the initial evaluation.

We did there, as I mentioned, if you look on page 7, that tritium contamination in shipping containers was corroborated; however, no actual contamination surveys have been found. One

of the individuals we had interviewed indicated that, you know, he had been a part of starting the program, but they had never found any tritium contamination, which is actually kind of surprising, that statement.

We looked at the sample analysis in Building 123 and the program there to ensure they had the capabilities. And it appears after the 1973 incident, they did have a good liquid scintillation technique for analyzing the tritium.

Our follow-up on our initial follow-up conclusions were the additional documents, interviews obtained during the post-ER follow-up, provide additional evidence for the potential for tritium exposure. And we also started to --- again, it also identified that the 1973 incident was bounding. We also were able to refine some of our calculations and to come up with a new approach for the tritium for bounding exposures. We basically isolated to three separate periods, pre-1973, 1973, and then the post-1973 period.

So, we had a secondary follow-up which

was after we had issued our first revision, and it was to look --- to, again, refine our calculations, address the Work Group and SC&A comments on the initial tritium White Paper. So, we issued this report, the second, or the follow-up that included that in May of --- May 30th, 2014.

So, our findings initially, or actually our approach for dose reconstruction for tritium you have, again, I said the pre-1973 period, '73, and the post-1973 period. We used -- the 1973 period focuses on the incident that occurred in April of that year, and the individuals that the --- that incident was initially identified, actually, from environmental releases, and so it was not -- actions were not taken until September of that year, so there were bioassay samples that were conducted in September of that year. We used those bioassay samples to actually bound our 1973 exposure. I'll talk a little bit about that more later.

We take a --- for pre-1973, we identified that the 1973 incident was the bounding

exposure, and we looked at other potential incidents of that magnitude. And, again, we came up with nothing that was close to the magnitude of the '73 incident.

So, what we looked at, what would be the most likely chronic exposure that would occur or that individuals would be routinely exposed to on a day-to-day basis of tritium. And we went back to the interview that was identified of shipping containers being opened and the bubbler, and the exhaust plenum, and if they heard --- and I'm just paraphrasing what the interview said. You know, sometimes they would get news that their bubbler was hot, later on so, you know, they could have been exposed to tritium. So, we felt like the shipping container was our most likely chronic exposure scenario that individuals would be exposed to.

We looked for pre-'73 data and, obviously, found no pre-'73 data on shipping containers and contamination. We have found a 1974 incident that involved a shipping container. We felt like this 1974 incident was more closely

resembling the type of exposures that individuals would routinely be exposed to on a daily basis.

The 1974 incident was in August of that year, and it involved a release of 1.5 curies of tritium. And, basically, what we did was we took the bioassay samples, the highest bioassay sample for that period and determined the individual's exposure from that bioassay. And as I --- the individual's dose came out to roughly .15 millirem. So, we felt like, again, that this was very close to the --- something that individuals would be exposed to in the early years, so we took what we felt was a pretty claimant-favorable assumption and assumed that the .1 --- or that an incident of this magnitude occurred every day for 250 days in a year, and we --- so, 250 times the individual's exposed to .15 millirem, and it roughly came out, if I remember correctly, 37.5 millirem exposure for a given year.

We felt like we could apply this exposure to all years previously because, one, we had no indication of any significant exposure

incidents prior to --- or other than --- in the magnitude of the 1973 incident.

We also went back and we did additional searches at Los Alamos, and the Denver Federal Records Center to look for potential incidents of that magnitude, and we could not find anything.

Now, again, I will qualify that in saying that they weren't exactly looking for it, either. But we felt that from a routine basis, the exposure from opening a shipping container was more likely the exposure than individuals would be exposed to.

So, our bounding, or our approach for dose reconstruction --- and, again, this is for partial dose reconstructions for the pre-1973 period would be to give individuals 37.5 millirem per year for that period.

The 1973 incident, and we'll get into some of the details later, and some of the issues that will be brought up by SC&A. We went back and we modeled the five individuals. Basically, there were 250 individuals that were monitored initially

after the incident. And, again, this was six months after the incident, but there were 250 individuals that had bioassay samples. They had a cutoff or a trigger level ---

CHAIRMAN KOTELCHUCK: Pardon me. Just five individuals after the '73 incident?

MR. RUTHERFORD: I'm going to -- actually, I'm going to add a little more information on that.

CHAIRMAN KOTELCHUCK: Okay, sorry.

MR. RUTHERFORD: There were actually 250 that were initially, I believe it was 250, 250 or 225 individuals that were initially monitored after the '73 incident. These individuals were individuals that we felt would be likely to receive the exposure from the incident.

They had a trigger level of 10,000 picocuries per liter for identifying individuals with further analysis. All the other ones were --- the initial 250 were not distilled, and then anybody that was over the 10,000, they distilled the samples to get a more refined account. They were

able to narrow it down to five --- I believe it was five individuals that they wanted to do further bioassay on.

Those five individuals, we actually modeled those. ORAU, and specifically Liz Brackett, took and modeled those bioassay samples to come up with --- and looking at their exposure scenarios, when they were potentially exposed, the date of the incident, other activities that could have driven potential exposures, and a lot of this information was in the report that was issued from 1973.

And then using our standard IMBA, and we modeled the bioassay data, and we had a highest intake of 84 millirem. We determined that we would take that 84 millirem and use that as exposure plutonium workers in the 1973 period, we would give them 84 millirem per year for tritium exposure.

And then for the post-'73 period, we looked at all the --- there was a bioassay program put in place. The bioassay program for tritium, there was a significant amount of bubblers and

monitoring that was done, contamination surveys post-'73, to try to identify sources of potential tritium exposure. And their monitoring program took plutonium workers and took 10 percent of those plutonium bioassay samples and further analyzed them for tritium. Again, this was not a task-specific, but it took all plutonium workers and did the 10 percent idea in the '74 to '75 period.

All the bioassay samples we went back and we looked at them in a coworker type approach for '74 to '75, and analyzed that data. And based on the data, the '74 to '75 period would have been less than 1 millirem; therefore, we would apply zero dose for that period. And all other samples post-'74 were in the same category. There weren't that many samples, but all of them came up in the same order of magnitude or the same range, and so we applied zero millirem for exposure on the post-'75 period after they stopped that 10 percent monitoring program.

Let me get back to some of the specific questions. Okay. All right. Some of the initial

questions that were --- SC&A responded with their initial response to our tritium paper, and identified using a different tritium model, and also for the 1973 incident, the five workers, the main worker, or those five workers, SC&A re-analyzed those five workers using a newer tritium model and came up with --- and a different intake date, and came up with different numbers. That was one issue.

There were other issues that were identified. One of the concerns that was brought up with using the 1974 incident to back-extrapolate for workers was the concern that the 1974 incident probably had additional controls that were put in place that would minimize or would make the exposures not reflective of what may have occurred pre-1973.

We had one --- we had found one document that kind of indicated it --- that controls weren't in place until after that incident, but then SC&A identified another document that indicated that it could have been in place before that.

CHAIRMAN KOTELCHUCK: I wonder, if you're going to talk about responding to the SC&A ---

MR. RUTHERFORD: This is just their first response.

CHAIRMAN KOTELCHUCK: Oh, okay.

MR. FITZGERALD: I'm good, so far.

CHAIRMAN KOTELCHUCK: Okay.

MR. RUTHERFORD: I'm going to let him ---

CHAIRMAN KOTELCHUCK: Okay. Because I thought he might then do it, and then you might say there is some ---

MR. FITZGERALD: No, no.

(Simultaneous speaking.)

MR. RUTHERFORD: And some of these are open issues that ---

CHAIRMAN KOTELCHUCK: That went back.

MR. RUTHERFORD: Carried forward.

CHAIRMAN KOTELCHUCK: Yes. Fine, fine. Please go on. I'm sorry to interrupt.

MR. RUTHERFORD: So we did, you know,

again, additional research looking into the issue of whether the '74 incident was more likely or was a reasonable incident to use, or situation to use to round down pre-'73.

We actually went back and we looked for documents at Pantex to try to figure out when Pantex had modified their program in support of the changes that were recommended after the 1973 incident. And based on our review of records, and information, and discussions, we did not see changes in the Pantex program until 1981. Now, that doesn't mean the other sites hadn't made changes.

In the '74 incident, one of the concerns that SC&A brought up was the fact that it was, I think, Pacific Northwest Laboratories that actually had sent the unit, which most of the units were coming to Rocky Flats were from Pantex, so they were concerned that it would be two different sources. We still felt that the actual source material size of the release in 1974 was much more indicative or claimant-favorable of a source term from that release perspective. And then there were

other issues that SC&A brought up.

And then they issued a follow-on report, and I'll let Joe go through all the issues.

MR. FITZGERALD: That was a pretty good lead-up. You know, first off, you know, we certainly are acknowledging the context. You know, we're dealing with partial dose reconstructions now that the '83 cutoff is in place, and clearly the tritium issue is relevant before '83, particularly in the '70s.

We --- not trying to revisit all that, but I think our second report had the advantage of getting the responses from NIOSH, and we refined our answers in the second report. Which, by the way, the --- I noticed on the DCAS website, it's the May version of the SC&A tritium paper that's posted, and not the September version. But the September version, anyway, I think goes into more detail on -- certainly in all three time periods. And we had a chance to do some further investigation as far as looking at some of the SRDB documents and were able to provide a little more refinement, for

example, on the pre-'73.

I'm going to jump these time periods, but pre-'73, I think we were able to identify additional documents, as LaVon was talking about, that helped identify what may have been the controlling practices at Rocky Flats post-'73, which makes a big difference as far as what one assumes the --- what one can assume is the representativeness of that '74 release, for using that as a bounding analysis for all the exposures before '73 at Rocky Flats to tritium; which, you know, again, is a pretty major assumption.

We can go into more detail right now. We have this broken up pretty much the way LaVon mentioned. We have an analysis that focuses on the 1973, the 84 millirem per year. And, again --- Joyce, are you on the phone, Joyce Lipsztein? I know we announced ---

DR. LIPSZTEIN: Yes, I am.

MR. FITZGERALD: Okay. I was just concerned that maybe you thought this was after lunch, but I think everybody is here. John Mauro,

are you here, too?

DR. MAURO: Yes, I am.

MR. FITZGERALD: Okay. Well, we broke this up into three time periods, the 1973 analysis. This is going to be not a tale of two cities, but a tale of three cities.

DR. MAURO: Yes.

MR. FITZGERALD: We have different perspectives, actually, on each time period. The first one, we have questions which may be leaning more TBD, but questions of the assumptions and start dates of exposures, and the particular model being used as far as whether it fits the particular circumstances of testing on the tritium, the monitoring on the tritium. And Joyce Lipsztein will be going into that in some more detail. She did the original analysis on the first review.

On the post-1973, a little different perspective for the Work Group. Our concern there is more questions of the validity of how the monitoring data is being applied. The frequency --- whether the frequency of monitoring was such

for tritium that you would see it in a representative way, and whether the location of the bubblers was such that you'd be monitoring in the right locations, things like that, and John Mauro will address those.

Pre-'73, as I was mentioning a little earlier, that's more of a question. This is kind of a standard question we get into when one is looking at back-extrapolation of data. You know, how representative is the data that you're trying to back-extrapolate? Does it fit the operations and the circumstances such that you can use that as a reasonable bounding analysis? And I'll certainly address that.

So, with that, Joyce, I'm going to turn it over to you as far as addressing some of the questions that you had for --- and issues that you had for the 1973 incident, and how that was modeled.

DR. LIPSZTEIN: Okay. I'm going to speak about this particular accident and the exposures that occurred in 1973. And it's going to be very technical, I'm sorry. But just repeating what was

said before, there was a tritium accident that occurred in April 1973, and from then on then Rocky Flats people thought that there was exposure to tritium.

This accident happened between April 9 and April 25, but the people were not immediately identified as having been contaminated, so they were monitored only in September 1973. So, we had more than 150 days; actually, the ones that the dose was calculated was around 170 to 180 days after the exposure. Also NIOSH identified there were also other opportunities for intakes in 1973. For example, there was an incident in September 1973 before the monitoring took place.

Because, as was explained before today, there was a large number of people that were monitored. At first, they were analyzed, the raw urine samples were analyzed without distillation, and then the count deficiency was only about 3 percent for this analysis. And from all this analysis, NIOSH says in its ER Revision 1 from September 2013 that the five most-exposed

individuals were identified.

Then NIOSH analyzed the data using only pre-distilled samples used for fix. They assume that tritium was in the form of tritiated water and used the IMBA model for inorganic tritium. And took several intake dates based on organ information and examination to urine sample results using IMBA.

And then 75 individuals, NIOSH only took two individuals as having been exposed in this April 1973 accident, which is supposed to be the highest incident that occurred in Rocky Flats, and would be the bounding dose. So, the bounding dose would be --- was calculated using only two individuals, not the five, only two. And NIOSH claims that the methods that were used to reconstruct these upper bound doses were scientifically sound because they followed the current ICRP guidance.

Okay. So, we have two things here. First, the model that was used to calculate the dose and to fit the intake to the excretion, because we had excretion rate results for those two workers.

The excretion rate results were fitted to an intake to calculate the intake and the dose using IMBA. What happens is that the IMBA model for inorganic tritium is not the model that is recommended by the ICRP. And there is nothing at least that I saw or that justifies the modification of the ICRP model. No peer-reviewed papers, nothing. But, anyway, it's not the ICRP model.

What happens with the ICRP guidelines? The current ICRP model was described in ICRP 78 in 1997 with a clarification that was published in ICRP 88 in 2002. The ICRP does not recommend the use of the current model when, for more than 100 days after the intake, so it's not recommended to use for about 177 days, 178 days, around 180 days after the intake, as was used by NIOSH. That's one of the things.

The second thing is that the current ICRP model is --- there is --- it's based --- actually, what ICRP 78 recommends is not to use for more than 30 days, but if you --- you can really expand it to 50 to 60 days after the intake. After

that, you kind of don't have the --- it's not very good, because the current ICRP model, it has like two compartments because there was a simplification, and 97 percent of the intake would have a half-life of 10 days, and then 3 percent a half-life of 40 days. But this is a simplification from ICRP 56 which had three explanations, and one of them was simplified and taken out. And because it was taken out, ICRP recommends that you calculate the body concentration divided by the water content of the body, and you have what is excreted in the urine.

Okay. Even if you use the ICRP at the 177 days after exposure, this was done, for example, by Potter in a paper he published in Health Physics in 2004, in which he expanded to calculate activities at 170 days and then using that, he has --- you can look in the Health Physics paper that he has expanded the ICRP model, even if ICRP doesn't advise on doing that. But if, you know, ICRP was used, then the results are different from the ones that are -- that were used -- calculated using

IMBA.

In addition, the model that uses IMBA is also different from the model citation in OTIB-0011 from 2004. And, in addition, if you go to 100 days, the IMBA model will be different from the ICRP model, which is reproduced in the agency document from 1994. And, again, it's different, also, from the results that were published in NCRP 161 from 2008.

The NCRP 161 2008 goes only until 100 days, and the agency documents from 1994 also only goes to 100 days. But after 60 days, even the NCRP and the agency document are in conflict.

So, in summary, there is no model that is in the international agreement for calculating intakes from tritium for more than 50-60 days after the intake, so it's really a big problem on how to calculate this.

The ICRP is going to issue a model for a patient that was not published yet, that you can go beyond that. But I agree with NIOSH that even though it was published in the website of the ICRP

by public consult, is not an official document, and I really feel better not using it, although SC&A used it because it was published in the website for public consult.

I don't know when the report is going to be published. It was supposed to be published in 2014; now it's 2015, so I don't know. Anyway, it's only about .02 percent of the intake that's going to have a half-life of about one year.

Okay. So, this is a very big problem of the long-term biokinetic oxidation to calculate the bounding dose. So, besides this problem on not having an international model that everybody agrees on it, there is another problem. The bounding dose was calculated using data from only two workers that NIOSH considered were exposed in the April 1973 accident.

DR. NETON: Joyce, this is Jim. Could we stop there and maybe address that first, or talk about that first issue before we get into how the dose is modeled based on just two workers?

DR. LIPSZTEIN: Oh, yes, of course.

DR. NETON: Yes. I think it would be good to stop there and talk about that. It's been a while since I looked at that. I know Liz is on the phone; hopefully, she can chime in here, but my understanding from looking at this a while back was that we actually did use the current model. And the model that was used in IMBA was a modification of IMBA to incorporate that new model. Is that not correct, Liz?

MS. BRACKETT: What we used is actually the ICRP 56 model. Tom's feeling was that ICRP 88 was just a rough approximation to be able to use software, you know, to do an assessment when you have results closer to the intake date. But IMBA doesn't actually have a model for assessing urine, so we had to put our own in. And, as I said, it's the ICRP 56 model that we used.

DR. NETON: And that's a two-compartment model. Right?

MS. BRACKETT: Yes.

DR. NETON: So, it's got the long-term compartment, and that was the current ICRP model?

MS. BRACKETT: Yes, the 40-day compartment. Yes.

DR. NETON: Right, so it does have that 40-day compartment.

DR. LIPSZTEIN: The 40-day compartment is in the 78 document, also, the 40-days compartment.

DR. NETON: Right.

DR. LIPSZTEIN: It's the 3 percent that has a 40-days compartment, because the inorganic tritium will transform into organic lead-bound tritium, and that will have the 40-days half-life.

DR. NETON: So, Joyce, I guess what we're saying is we used the current ICRP model with the 40-day half-life for ---

DR. LIPSZTEIN: No, no, no, no. The current ICRP model, for example, if you take the Potter paper, he calculates until 400 days using the current ICRP model. And the results are different from the one in IMBA. And if you use the OTIB-0011 also on patient, the results are different, also, from the one that was used in IMBA.

And if you compare it with the NCRP model 161 which was done, I think, after this model, if you go only until 100 days -- it only goes until 100 days, but it's different from the current ICRP model, and it's different from the IMBA model, and it's different from the agency model.

DR. NETON: Right.

DR. LIPSZTEIN: So, it's a whole mess this problem of --- after 50 to 60 days, the models don't agree anymore.

DR. NETON: Well, as you know, we are committed to using the current ICRP models in these calculations. There's no latitude.

DR. LIPSZTEIN: Yes. But the one in IMBA is not the current.

DR. NETON: So, what is the model that Potter used that you're saying is the current ICRP model?

DR. LIPSZTEIN: Yes, that's exactly. He extended it. Although ICRP says you shouldn't do it after 100 days, he extended it to 400 days.

DR. NETON: What model --- which ICRP

was that: 78, 56?

DR. LIPSZTEIN: 78 was a clarification 88. It's based on --- it was so confused. I'm saying this because I know from inside the ICRP, it was so confused that after 78 they issued a clarification in 88 because nobody knew exactly how to deal with it.

DR. NETON: So, what I'm hearing, though, is the 56 model and the 78 model are the same biokinetic model.

DR. LIPSZTEIN: Not exactly, because they decide this for the term. The 56 just says there was a third term on the equation but they are not going to use it because it's very rare that you do monitoring after 100 days, so they took out the third term. And the new model that is going to be introduced by the ICRP puts again the third component.

DR. NETON: No, but what did the 78 model have in it, not the third term?

DR. LIPSZTEIN: Two compartments.

DR. NETON: Right, which is ---

DR. LIPSZTEIN: The 40 days and the ---

DR. NETON: Which is the same as the 56 model.

DR. LIPSZTEIN: Yes.

DR. NETON: Okay. So ---

DR. LIPSZTEIN: It's based on ---

DR. NETON: --- we are using the ICRP 56 model which is the same as the 78 model.

DR. LIPSZTEIN: No, no, it gives completely different results.

DR. NETON: Well, I don't understand what you're saying.

DR. LIPSZTEIN: You have the IMBA model, you have the ORAU-0011 which is almost exactly the same as the ICRP. You have the agency model which is exactly the same as the ICRP, and you have the Potter, which is exactly the same. But if you use the Potter ----the Potter model is the only one that goes until 200 days. Okay? If you use the --- if you look at the tables that were published by Potter in Health Physics and you look at the results you

have from IMBA, they are different. And it's significantly different.

DR. NETON: Which IMBA ---

MS. BRACKETT: IMBA does not have a model for tritium ---

DR. NETON: Right.

MS. BRACKETT: --- urine excretion.

DR. NETON: Right. So, I don't know which IMBA you're talking about, Joyce.

MS. BRACKETT: Right.

DR. LIPSZTEIN: That's the one that was used because here it says to use IMBA to fit the dose, so I calculated how much was going to be the excretion rate if I use the intake that was calculated by NIOSH, and the excretion rate is completely different from the one that was --- that the worker had.

DR. NETON: All right. I'm still confused, I guess, because ---

DR. LIPSZTEIN: Because it's confused, Jim. What happens is that --- I don't know what is done in IMBA, because I don't use really IMBA. What

I know is that if you use the Potter data, which is exactly the ICRP and you use --- you get a different result from the one that was obtained here.

CHAIRMAN KOTELCHUCK: For some of us who are less well acquainted with this modeling, are you talking --- let's talk about, are we talking on page 16, there is a three-component exponential function? Is that the correct equation that we should be looking at?

DR. LIPSZTEIN: Let me follow. There should be three exponential terms, but what ICRP did in the current model, it simplified and took out the third component.

CHAIRMAN KOTELCHUCK: Okay.

MEMBER MUNN: Are you talking about page 16?

CHAIRMAN KOTELCHUCK: Page 16, yes.

DR. NETON: I guess ---

CHAIRMAN KOTELCHUCK: Yes, page 16 of SC&A's report.

MEMBER MUNN: Okay.

DR. NETON: So, what I don't understand is if we use the ICRP 56 model ---

DR. LIPSZTEIN: No, Jim, you didn't.

DR. NETON: --- in IMBA ---

DR. LIPSZTEIN: I don't know what was done, but it doesn't ---

DR. NETON: Well, I could tell you, Joyce ---

DR. LIPSZTEIN: --- match.

DR. NETON: I don't know what you compared. That's the problem. You ran ---

DR. LIPSZTEIN: Oh, okay. I had the Worker D, Worker H. He had --- was calculated by his excretion rate that he had an intake of 1,240 microcuries. Okay?

DR. NETON: Right.

DR. LIPSZTEIN: So --- and I have to find it, just one second. The numbers, just one second, let me find the numbers. You'll see. Just one second. Okay?

DR. NETON: Okay.

MS. BRACKETT: While she's looking, I

would just mention that our doses are almost identical if we use the same intake date. The primary difference in the doses that we got were because of the choice of different intake dates.

DR. LIPSZTEIN: No, no, no. Only the ones that were very close to the intake. Like, for example, the Worker H is calculated using this --- as if the intake date was in September, and it was monitored in September, then we get the same results, but not if you do it for a long time after intake. After 50 to 60 days of intake, everything goes different. Even the NCRP model goes different. I want to find the numbers. I have it, but I have so many things open in my computer that I have to ---

CHAIRMAN KOTELCHUCK: We can wait. We have the time.

MEMBER MUNN: Don't feel pressured, Joyce.

CHAIRMAN KOTELCHUCK: Don't ---

MEMBER MUNN: No.

CHAIRMAN KOTELCHUCK: Also, we will

come back after lunch.

DR. LIPSZTEIN: Okay, and then I'll have that, if you want.

CHAIRMAN KOTELCHUCK: It might be good to break.

DR. NETON: Let Joyce find it.

MEMBER MUNN: Yes, that would be a good idea, gives you an opportunity to find it.

CHAIRMAN KOTELCHUCK: Right, without our waiting on you and feeling under pressure. It's 12:00 anyway, so it works well. So, why don't we take a break right now. It's a few minutes after 12, we'll get back together at 1:00. You'll have a chance to look through the data calmly without our --- people looking over your shoulder.

DR. LIPSZTEIN: Okay. It's from our last report, but I just have so many reports in front of me.

CHAIRMAN KOTELCHUCK: Oh, absolutely. No problem. It works out, this works very well administratively that we break for lunch, and at 1:00 we come back. We'll continue that. And also

for the petitioners who are on the line, it looks like we'll --- you know, we may finish earlier in the afternoon, but you're on the line, so whenever we finish and we get to that as the final item, we will ask for your report, or for your further report. Okay?

DR. LIPSZTEIN: But just before you finish, Jim, think about it, and Liz, and everybody. Even, you know, if I say they don't match the results with the Potter data which uses the current ICRP model, the ICRP model says specifically it should not be used after 100 days, so it doesn't matter. I'm going to find this data to show that it's not the same model. But, anyway, it doesn't matter so much, because the ICRP says you should not use this model for over 100 days. Just that, okay?

DR. NETON: Okay.

CHAIRMAN KOTELCHUCK: With that ---

DR. LIPSZTEIN: See you after lunch.

CHAIRMAN KOTELCHUCK: See you after lunch. Okay, we'll get together at 1:00. Okay, very

good.

DR. LIPSZTEIN: Bye-bye.

MR. KATZ: Take care. Have a nice lunch, everybody.

(Whereupon, the above-entitled matter went off the record at 12:05 p.m. and resumed at 1:07 p.m.)

CHAIRMAN KOTELCHUCK: Let's resume the discussion that we were having before. Joyce, do you want to start out?

DR. LIPSZTEIN: Yes, I found the data. It's on page 17 of our response to NIOSH White Paper from September 2014. It's the second paragraph, the one that is in regular characters. And it says like if I use the ICRP model and the one that exactly matches the numbers from Potter, and the one that matches the number from the agency documents until 100 days, I get that the calculated intake of 1,240 microcuries.

This was the calculated intake from NIOSH corresponding to excretion rates of 26,320 picocuries for one of the results, and the other

result was 33,040 picocuries on days 177 and 178, respectively.

If you use the ICRP model as it is now, wrongly as it is now, you get 15,000 picocuries at 177 days, instead of 26,320 picocuries, and you get 14,756 picocuries at the 178 days, instead of 33,040 picocuries. So, you have one-half of the results from NIOSH.

So, the model is not the one in ICRP, but I think that, you know, this discussion, as I told you before, I think it's innocuous, because any model that we would apply at the 177 days after the intake, and 178 days after intake, they are not recommended by ICRP.

And even if we --- if the new model was already published, the fraction that has a longer half-life of one year, this is the new model, is so small that the uncertainty is very high when you get to almost 180 days after the intake. So treatment should not be monitored for such a long time after the intake. You can't get a good --- you can't calculate a realistic intake by using data

that is so long after the intake. And all the recommendations from the agency, from NCRP, from the ICRPs do not use tritium models after 100 days.

So, this is one of the big points, I think, on the model that you --- I was supposed to stop on the difference on the models. Right?

DR. NETON: Right. I guess now I'm trying to figure out what you're really saying then. We can't do any kind of calculations or not? I mean ---

DR. LIPSZTEIN: I think you can't do.

DR. NETON: All right. Now, that's new.

DR. LIPSZTEIN: You know, until the 56 that even 100 days is --- the problem between 60 and 100 days is that the NCRP model doesn't match the ICRP model. But after 100 days, if you have excretion after 100 days, it's very difficult to go back to the intake because the models are not meant to --- the half-life is too small to really get a meaningful result at 180 days after exposure.

DR. NETON: I don't know. I mean, three half --- 40-day half-life and you go ---

DR. LIPSZTEIN: Yes, but it's only 3 percent, and it's different into OBT.

DR. NETON: I understand. Well, you know ---

DR. LIPSZTEIN: So, anyway, it doesn't match. It doesn't match. As I --- you can see on that page, the IMBA model doesn't match.

DR. NETON: Oh, yes. We ---

DR. LIPSZTEIN: And the other problem is that you have, for example, one worker that was Worker A. Worker A, he supposedly had --- he was exposed in the April accident, and then he was exposed again in September.

What happens with an exposure in April, one exposure in September, and you get monitoring data in September? What happens is that the September exposure will dominate the excretion rate of the monitoring taken in September. Right?

DR. NETON: Yes. No, I understand that, but I thought we looked at that, and the guy really wasn't in the position to have that exposure in April.

DR. LIPSZTEIN: I didn't see why, because Worker --- you had a work --- he was exposed together with --- he was working with Worker D, and he was working with Worker P, and the three of them were exposed on the April accident. So, to say that his excretion rate doesn't agree with the other ones, of course he wouldn't because he had also the September exposure rate.

And I calculated, for example, what would happen if --- I used the new model, the one that has a component with one-year half-life, also. And if you --- you can do a combination of exposure in April and exposure in September, and the data will fit very well, you know, the urine excretion rate. But the difference in dose is more than 100 times, so --- and this is, of course, because you have such a domination from the long --- from the recent exposure that any model that you use, the recent exposure will dominate. And you'll never know how much he was exposed.

DR. NETON: Right.

DR. LIPSZTEIN: And then if you let me

just continue to --- not only about the model, but then you have --- then the model was used on Workers D and H. Can I proceed with this?

CHAIRMAN KOTELCHUCK: Yes, proceed.

DR. LIPSZTEIN: Okay. And the Case D has a lot of uncertainty, high uncertainty on those results. And this, you know, was recognized by NIOSH. It says, "Case D submitted samples on only three days, although there are two results on two of those days. In one instance, one of the samples was distilled. On the other day, there is a note stating repeated with sample generation. On the later date the results differ by a factor of almost 2."

And then the Case H, which the bounding dose was calculated based on this result of Case H, if you look at it, it was based on only two results. This person has two non-distilled results, and has four distilled results, but the uncertainty is so large that both the distilled and the non-distilled dose, the urine excretion rates increase instead of decreasing when you have, you

know, different dates that the samples were taken.

So, for example, the non-distilled samples that were used, they were taken on day 177 -- days after the intake, and 178 days after intake, and the results from one --- the excretion results from 177 days is smaller than the excretion rate for 178. And if you take the distilled samples that were not used, you have samples at 180 days, 185 days, 170 days, and 188 days. And all those samples, they increase with time, instead of decreasing.

So, the uncertainty is very high on those results, so you can't --- so, you are calculating a bounding intake and dose from a worker that has a high uncertainty on the bioassay results, and we are not certain about the application of the tritium model.

DR. NETON: Okay.

DR. LIPSZTEIN: So, I --- in SC&A opinion, I think you can't --- there are great uncertainties on this calculation of the bounding dose aggravated by the lack of a correction international accepted model for tritium, so we

think that you cannot calculate a bounding dose based on this worker.

DR. NETON: So, do you suggest then we don't assign any dose to the non-presumptive cancers during the SEC period?

DR. LIPSZTEIN: Yes.

DR. NETON: That's the ultimate conclusion that you would arrive at.

DR. LIPSZTEIN: Yes, yes, yes, yes, I think so.

DR. MAURO: Joyce, this is John Mauro. I was reading over the weekend a lot of the literature standing behind what we're talking, and I seem to recall your picking one particular case. It might have been that Case A, I'm not sure, where you said well, if you really wanted to try to assign a bounding dose from the intake that occurred on the 18th of April --- in April of 1973 based on data that you've collected sometime in September, and you use the three-component model, you came up with a dose, if I recall, of something on the order of 6,000 millirems.

DR. LIPSZTEIN: Yes. That's using ----

DR. MAURO: --- as opposed to their 84. And you seem to be ---

DR. LIPSZTEIN: Yes.

DR. MAURO: -- your sense was that it's not the greatest, but if you're going to put an upper bound, that might be a good one. So, I'm hearing two different things right now.

DR. LIPSZTEIN: Yes. John, you are correct, because it was a little bit confusing; because I was applying the new model that is going to be used, but I think NIOSH is correct in this way. The ICRP didn't publish it officially, so I don't feel --- you know, and I am on the committee. I should not apply it before it is officially published.

I only did it because it was published in the website for public comment, so it was nothing that was confidential. It was open for the public, and it's still open for the public. It's just going into the website.

DR. NETON: Okay.

DR. LIPSZTEIN: It's unrealistically high, also, 6,000 rem. So, I think the best thing is to say it's not possible to calculate the bounding dose. There are too much uncertainties on this.

DR. MAURO: I'd make one more point certainly for the consideration by the Board. We have been in circumstances before, I think this is written up in our reports, where we were confronted with a difficult situation like high-fired plutonium, where there were really no approved models at the time from ICRP to deal with that. And somehow we tried to come to grips with it, and we actually ended up doing that. And by matter of --- this goes more to a policy decision.

If there is an interim model, such as the one that Joyce just described, that is under consideration, I don't know how --- you know, where it lies in the process, but if that --- you know, are we in a hard and fast position where well, if it's not published by ICRP, we really are not in a position to use it, or is there some degree of

flexibility here in trying your best to assign a plausible upper bound?

I understand what you're saying, Jim. If you can't do it, then you won't assign anything.

DR. NETON: Yes.

DR. MAURO: So really, it becomes a question of well, do we assign nothing, or do we try to assign a number but, of course, it has to be a plausible upper bound.

DR. NETON: Yes.

DR. MAURO: And therein lies the dilemma.

DR. NETON: Let's look at what we're trying to accomplish here, though. They took samples on 250 people. These five cases were the ones that were the highest values that they could find. Right? And what we're trying to do is not to reconstruct these guys -- well, we could reconstruct these guys' doses and argue about what their doses are, but what is a valid dose to assign to everybody else?

DR. MAURO: Yes, yes.

DR. NETON: Knowing that everybody else was well below these guys, including the 245 other people that were sampled that had the highest potential. We're talking about assigning this 84 millirem to everybody regardless of where they were.

DR. MAURO: Yes.

DR. NETON: So, I think that you do have to allow for some degree of uncertainty in this calculation.

DR. LIPSZTEIN: But then you have, as you consider the Worker A, which was doubly exposed in April, also. And if you want, all the --- you know, this 365 days, there are some papers that confirm this 365 days. And, actually, the HBA in the U.K. has adopted the 365 days. And there are many --- many, no, but there are some papers talking about this 365 component.

CHAIRMAN KOTELCHUCK: I don't know where the 365 comes in. Excuse me.

DR. LIPSZTEIN: Okay, I'm sorry. The new model from the ICRP, the one that it's going to be

adopted, talks about the 10 days half-time, the --- half-life, the 40 days half-life, and he puts another component of OBT also, that has a longer half-time of 365 days. And so, we see it, you really could see what was the --- you know, related to the intake with excretion rate at around --- at about 180 days.

CHAIRMAN KOTELCHUCK: All right.

DR. LIPSZTEIN: So the difference --

CHAIRMAN KOTELCHUCK: Go ahead.

DR. LIPSZTEIN: I'm sorry?

CHAIRMAN KOTELCHUCK: Go ahead, Joyce.

DR. LIPSZTEIN: No, just the difference between the --- applying 365 days and applying 40 days for OBT, because new model has two compartments. It's very large, so it will increase the dose. And you really can do, I think, not --- I think that probably this Worker A, he was exposed in both accidents, not only --- of course, the bounding dose was supposed --- as only exposed in April, but he probably had an exposure in September, also.

DR. NETON: You know, I'd like to talk about that a little bit, Joyce. I think Liz, maybe, has been looking at that.

MS. BRACKETT: Yes.

DR. NETON: Can you comment on that issue, the Worker A, and why we don't believe he might have been exposed in September?

MS. BRACKETT: I will have to --- I have to apologize, my computer died. It was dead all day yesterday, and I just got it back this morning, so I didn't have time to review this, and I ---

DR. NETON: I know we looked into that, and we have some reasons why we don't necessarily agree with that.

DR. LIPSZTEIN: Jim, what I read from the papers that you published, is that he didn't have an excretion rate that matched excretion rates from Worker D and Worker P, who were working with him in April. But the problem is that if he had an exposure in September also, of course, it wouldn't match. And even if they --- if he didn't have, not necessarily at 180 days after he would have the same

excretion rate as Worker D and P. And P didn't have anything, so even though D was with P, and D was considered having it. And Worker D is this one that has two urine samples on the same day, one double of the other result, so the uncertainty is very big.

I think the uncertainty in all this is very big. That's my feeling, what I think.

DR. NETON: Well, I think what I'm hearing now is that SC&A has changed their opinion, that we can't reconstruct doses in this time period. And I guess I'd like to see that in writing so we can consider it.

I mean, I understand what you just said, but if that's your official position, I'd like to see that documented somehow so that we can have it documented and look at it, and we'll consider it. Although, I'll have to be honest, I'm uncomfortable saying we can do zero for these people for tritium exposures.

DR. LIPSZTEIN: Jim, actually, our position, official position that we put in the paper is that either you consider the 6,000 which

is a huge number, which would be all --- a really bounding exposure in April, or you can't do it.

DR. MAURO: Can I try something out? You know, I understand the dilemma, Jim, and I really understand the dilemma, the 84 versus 6,000, the fact that we only have five workers with measurable levels.

DR. NETON: Right.

DR. LIPSZTEIN: And only three that could be exposed in April. The other two were ruled out. They were not exposed in April.

DR. MAURO: Well, let me --- that's where I'm headed with this question, one of these things. Let's assume that 500 people were --- I'm going to make up a number. Okay? This is more of a thought problem that may help us solve this thing.

Let's say you've got a large number of people that were exposed in the April incident, and you don't --- and you start collecting data sometime in September. And just for the sake of a thought problem, let's assume everyone that you measured was below the limits of detection, okay,

for tritium. And then you're going to say well, we know that there were at least some people that actually experienced exposures to tritium in April.

Perhaps we don't have any large exposures, but because we're collecting samples so far out into the future, 180 days later, that it's going to --- you know, we wouldn't expect to see anything, even if there were relatively large intakes because of the clearance and the retention functions.

So, one could say --- I mean, almost thinking about this lower limit of detection question so, in effect, what you're really saying is let's forget about these five people for a minute. Let's talk about all the others that might have had some exposure, but you didn't see anything.

Couldn't one ask the question, well, let's assume those other people, or at least some of those other people were at one-half the MDA for tritium, and you're reporting zero, or you're

reporting undetectable, but in theory they could have had some intake.

I mean, the question is well, what intake would they have had to have for them to have experienced a reading in the urine that's below the detection limit.

Now, we don't know who those people are. It could be a large number. And we don't know who those people might be, but some of them may very well have had a fairly large intake and be undetectable at 100 ---

DR. LIPSZTEIN: Yes.

DR. MAURO: I'm almost done. Now, the dilemma you have is, if you were to take that tact, then the question becomes do you use the two-compartment model that's approved by ICRP right now, or the three-compartment model to back calculate? You know, what would the intake have to have been to get one-half the MDA 180 days later? Isn't that one way you could come at this problem?

DR. LIPSZTEIN: I think it's a very good question, John, but I think there is no currently

accepted international model that goes back 180 days. That's a problem, unless you use the new ICRP model which was not published yet.

CHAIRMAN KOTELCHUCK: Joyce, I'm sorry.

DR. LIPSZTEIN: Yes?

CHAIRMAN KOTELCHUCK: No, no, I interrupted you. Pardon me. But I have a concern that comes from a different place, just in terms of what SC&A is proposing.

I feel when you said that you were using a model that was on a website by another organization, professional organization that's contemplating something that is not --- not only I feel like we can't use it, we're acting on behalf of the U.S. Government.

The U.S. Government --- this is a confidential source. I mean, confidential in the sense that they're asking for information from around the world. There may be somebody in Australia, or Brazil, or excuse me, Australia or Austria who will come in and say the whole thing is wrong. I want to change it this way.

That model is not usable and is, essentially, in my opinion, confidential in terms of it is held by that organization. It is theirs, and when they announce it, fine. So, I don't think that we can as a government agency use the 6,000 alternative that you propose. That, to me, is off the table. We need to resolve the question.

DR. LIPSZTEIN: I agree with you 100 percent. I don't feel well to use it, also. I think that we don't have any approved model that will go beyond 100 days.

DR. NETON: I think, though, Joyce, that we are committed to using the best available science, and I stress the word "available." The best available science is the current model, and there are many things, as you pointed out, that Gus Potter published in a peer-reviewed journal, an extension of that model out past 100 days.

DR. LIPSZTEIN: Yes, but he is using it, you know, outside the scope of ICRP. He says I'm using ICRP model, but ICRP says you don't use it over 100 days.

DR. NETON: Again ---

DR. LIPSZTEIN: NCRP 161 also goes only to 100 days, and has a different model. And it's from the, you know, United States, NCRP.

DR. NETON: I would prefer to use the best available science that the ICRP model has, recognizing the peer-reviewed literature has extended it beyond that, and assign some type of dose to these workers for tritium rather than say nothing, no dose.

DR. LIPSZTEIN: Yes. But, you know, Potter is the only one who goes beyond 100 days, and he says he's using ICRP model. And the ICRP recommends not to use it over 100 days.

DR. NETON: Then why would it be published in peer-reviewed literature if it wasn't --- had some validity?

DR. LIPSZTEIN: Yes, but you read it, you'll see he's using it beyond ICRP recommendations. And the NCRP also says --- also has that, until 100 days. The agency, the International Atomic Energy Agency only goes also

to 100 days.

MR. FITZGERALD: Joyce --

DR. LIPSZTEIN: You know, using beyond this is --- we have a mandate to use ICRP models, but ICRP doesn't recommend to use --- there is no ICRP recommended model over 100 days. And if Potter used, he used it wrongly.

Anyway, it's not the one that using in --- was used by NIOSH. You can modify it, but I think it's going to be still wrong, because it shouldn't be used over 100 days. And we still have the problem of Worker A, that you can do a combined intake of in April and September and get results, because he has better data than Worker D and Worker H.

And Worker H, you know, just getting a bounding dose with Worker H that has two points, and they go up instead of going down.

MR. FITZGERALD: Joyce ---

DR. LIPSZTEIN: You know, it's a lot of uncertainty in those two data.

CHAIRMAN KOTELCHUCK: Joyce, Joe is

trying to get something in. If you would excuse us, not excuse us, if you will wait for one second.

MR. FITZGERALD: Yes. Thank you, Joyce. Sorry to cut you a little short.

What Jim, I think, is clarifying is that we're sort of in this non-ICRP space, meaning that, you know, the new ICRP three-compartment model isn't available. And given the fact that by policy we're held to what is available, he's offering that as with the high-fired plutonium issue that we worked on quite a while ago, that was resolved, in a sense, by a technical or scientific approach; not a model, per se, even though there were rumors that ICRP was working on such a model.

But, certainly, using a very pragmatic approach based on, as I recall, transuranium data?

But, you know, basically using empirical data and using what we had in the way of available methodology to come up with the best science to provide a fit, an imperfect fit, but one that was the best available.

I think --- my sense is that's where

we're at, that in the absence of this ICRP --- this new model, we're --- I think everybody wants the best, pragmatic, and empirical-driven fit that's going to provide some satisfaction on the post-100 days issue. And that's kind of what we're asking for, is some consideration in that direction. And I think there are some differences of opinion whether we've achieved that in the best way possible.

That's a different issue than saying go or no-go. That's sort of saying is it the best fit and best approach available by science given those circumstances? And I think from our vantage point, that's what we want, too. Acknowledging that we just can't have that three-compartment model, it's going to have to be something that is founded on what we do have.

Do you agree with that? I think that's where we're at.

DR. LIPSZTEIN: Yes, but imagine we agree on a model, or there is a model that is done, so to which data are we going to apply this model?

We have only --- NIOSH only considered two workers from the five that were exposed in April. And those two workers have a lot of uncertainty on the data. The one that the dose was calculated, bounding dose was calculated only has two points, and the excretion rate goes instead of decreasing like you expect, it increases. And the other has also a lot of uncertainty, so we don't have really results on which to base, you know --- on which to apply any model.

CHAIRMAN KOTELCHUCK: But, Joyce, we have an imperative as a Board to decide issues on behalf of claimants. There are people out there who are ill, or possibly passed away, and they and their families need to know what our decisions are as promptly as we reasonably can so that it's not --- there is an imperative to make decisions, to make the best ones we can with understanding that we have to be pragmatic so that we can do something. We can't just say let's wait for ---

DR. LIPSZTEIN: Oh, no, no. What I'm suggesting is that even if we had the newest model

published, the data that we have to apply the model is so uncertain that it wouldn't be correct, anyway.

CHAIRMAN KOTELCHUCK: Okay.

DR. LIPSZTEIN: So, I think that the best thing is not --- you know, is to say we can't calculate the bounding dose.

DR. NETON: Joyce, this is Jim. I'm going to offer this up. We're going to go back, and I thought we had looked at these arguments that you made about why these certain people didn't --- you know, the guy could have had a previous exposure. And I thought we addressed that issue.

Apparently, we're not ready to talk about it today, but we'll go back and relook at that, because I'm pretty certain when I looked at the data that there were valid reasons why the person probably wasn't exposed way back in April. So, we need to go back and look at that, and put that right in front of you so we can discuss it from our position.

And, also, I want to go back and justify

--- not justify, but discuss why we believe we're going to use the current model extended beyond 100 days. I think there's a valid reason for doing that. I don't think there's anything that prohibits us from doing that.

DR. LIPSZTEIN: And, Jim, please look at the data from the two workers that were considered. They are very uncertain. The excretion rate goes up instead of going down in Worker H.

DR. NETON: Yes. Well, you know how bioassay models go, Joyce. I can show you a lot of models where ---

DR. LIPSZTEIN: Yes, yes, but you'll see --- you know, it's working on a bounding dose on only two points from a worker leaves a lot of uncertainty.

DR. NETON: Two points out of 250 workers ---

DR. LIPSZTEIN: Look at it. You're going to look at everything, look at it, though.

DR. NETON: I understand, but it's two points out of 250 workers that were sampled.

MR. KATZ: Jim ---

CHAIRMAN KOTELCHUCK: Ted.

MR. KATZ: I just want to say when you go back and think about this to keep in mind from a policy perspective you do have a feasibility issue. And you can't apply a new standard to feasibility because these are non-presumptives than you in other circumstances. There's not really much leeway for that, so if truly at the end of the day you decide this wouldn't hold water, and you would normally be establishing a Class on this basis, you can't flip around and then use these methods to reconstruct doses for other workers.

DR. NETON: I understand what you're saying.

MR. KATZ: Because then you're contradicting your own policy.

DR. NETON: We've also had a sort of --- I don't know if it's a written policy, but the policy has been where the doses are very small and we're adding them, we allow for a lot more uncertainty in the dose.

MR. KATZ: More latitude, right.

DR. NETON: And we're talking about 80 millirem here, it's not a huge dose.

MR. KATZ: Right. No, all I'm saying is --- I'm not making a judgment about the fact ---

DR. NETON: I understand.

MR. KATZ: I'm just saying if the science and the factual information, the base is really shoddy, then you need to think about it.

DR. NETON: I agree with you. I agree.

CHAIRMAN KOTELCHUCK: Wanda.

MEMBER MUNN: I hope that this is partially instructive, that we again look at why we're doing what we're doing.

I believe we've shown by our experience that the primary thing our claimants are most concerned about is whether they were injured while they were employed by the federal government.

There may be new information about the biological effects of tritium of which I'm not aware, because I don't work in that particular field, but unless I'm seriously mistaken, there is

no evidence that doses of the magnitude we're talking about of soft beta exposure is deleterious to human health.

I can understand their attitude if we --- and we need to add that to potential exposures, but absent the fact that our claimants can't be expected to understand what I'm saying here fully, it seems reasonable that based on the best science available to us we can establish at least a limit that makes sense with respect to which no person can assume to have been exposed in this case at Rocky Flats.

Once we establish what that is, then surely the question of whether or not that is completely accurate is a secondary one. The question is not whether it's completely accurate, it's whether it's adequate, and whether it is reasonably accurate. So, if we're going to agree that 6 rem is an unreasonably high number, then I don't think that we can truly argue that less than 1 rem is too small a number. It is, obviously, in the reasonable range.

It appears that the work we have to do is come to some conclusion as to what is reasonably acceptable given the best science available to us. If I'm incorrect, then we should go on a different tact, but it seems to me that that narrows down what we need to do.

CHAIRMAN KOTELCHUCK: Presumably ---thank you. Presumably, then you folks can have technical calls in the committee as you try to resolve this.

MR. KATZ: The technical calls aren't to resolve, but just to clarify matters. The resolutions always have to have to happen in the ----

CHAIRMAN KOTELCHUCK: That's right. Right, and just as I was going to say.

MR. KATZ: Sorry.

CHAIRMAN KOTELCHUCK: Then it will come back to us and/or to the Board --- actually, to us first, and then on to the Board. So, we'll leave it in your hands to be talking together.

DR. NETON: Yes. I will say that this is

truly a Site Profile issue, because it's not related to does this SEC after '83 move forward.

CHAIRMAN KOTELCHUCK: Right.

DR. NETON: We're talking about 1975 time frame here.

CHAIRMAN KOTELCHUCK: Right.

DR. NETON: So, again, this has nothing to do with --- well, it may have, but it's not really relevant for the Board to make --- the Working Group to make a decision whether or not an SEC should be extended after 1983.

MR. KATZ: Just how to do dose reconstructions.

DR. NETON: Just how to do the dose reconstructions for a Class that's already been added.

MR. FITZGERALD: I think a clarification is, you know --- assuming that when you're ready would be one --- a two-part issue. One, how --- what's the best approach to doing a dose reconstruction? What dose reconstruction approach would be warranted based on the best

available information? And the second thing is how would you apply that to the worker bioassay data that we have? And, clearly, there's a question of implementation, as well as a question of what approach you apply. So, those two things, I think, would be laid out.

Now, to avoid going beyond clarification, I think it would be useful just to get that in writing back from NIOSH to the Work Group. And if we have a clarifying question about that, then we can certainly have that call.

I don't know if there's a --- you know, I mean, it seems like some of the issues that we're talking about are beyond clarification, more of a discussion about what --- so, that may be something that the Work Group on a telephone call ought to address rather than ---

DR. NETON: I would suggest that the other remaining issues that are before the Working Group that are SEC-related should take precedence over resolving this issue right now, because this is not required to determine whether the SEC

petition is closed. It's not relevant to that.

MR. KATZ: Right. It's not an SEC issue.

DR. NETON: So, if it's not an SEC issue, then the Working Group, in my opinion, at least, should focus on the issue that still may have SEC relevance after 1983.

CHAIRMAN KOTELCHUCK: I'm not sure I follow that.

DR. NETON: Okay.

CHAIRMAN KOTELCHUCK: In that the level of --- this relates to what exposures we're using to bound.

DR. NETON: During a period that's already an SEC --- it's already been decided that this time period, doses can't be reconstructed, not for tritium reasons, but for was it ---

MR. RUTHERFORD: Neptunium.

DR. NETON: Neptunium, uranium-233. There's --- an SEC is already going to have the Rocky Flats up to 1983.

CHAIRMAN KOTELCHUCK: Right. I'm trying to think of people who are in partial --- who are

---

(Simultaneous speaking.)

MR. FITZGERALD: That remains the standard.

MR. KATZ: Yes, that's the standard that definitely matters for them, but the priority always for all Work Groups is to complete the SEC consideration, because that's sort of the biggest human impact is resolving that.

And then sorting out the dose reconstruction issues for those who are already covered by an SEC is sort of second ----is second tier business. But I don't see any reason why these both can't go on if you've already sunk your teeth in them.

DR. NETON: But the other, prior issues should take precedence.

MR. KATZ: But like for this Work Group meeting you should be ---

CHAIRMAN KOTELCHUCK: Priority.

MR. KATZ: Right.

CHAIRMAN KOTELCHUCK: Okay. All right.

So, then that is decided upon, not resolved.

MR. FITZGERALD: For the specific proceeding ahead, I think you're going to, Jim, provide that interpretation and ---

MR. RUTHERFORD: We're also going to look at the justifications for the dates that we've chosen to start for intakes.

MR. FITZGERALD: Right. And I think that will be conveyed to the Work Group and SC&A. Then if we need clarification we can have a call. If it's a question of debating that, then that's the Work Group's ---

CHAIRMAN KOTELCHUCK: Okay.

MR. FITZGERALD: You know, there may not be any clarification needed.

DR. NETON: These comments that Joyce has made, we've heard before, and I thought that we had addressed this, but nobody has it in front of them at this point, so we need to revisit those and be clearer as to where we're coming from.

CHAIRMAN KOTELCHUCK: All right. Then that's finished for the moment, and we should go

ahead. Do we want to do post-'73? We're talking about --- that was '73.

MR. FITZGERALD: Let's do post-'73.

CHAIRMAN KOTELCHUCK: Post-'73 it is, okay.

MR. FITZGERALD: I'm not sure John needs any introduction on this, but, John, are you still on?

DR. MAURO: Oh, yes, certainly.

MR. FITZGERALD: Okay. I know you've been waiting for your time.

DR. MAURO: I'd be glad to try to help out here.

And, again, I'd like to preface this discussion also reiterating before we were talking about doses that were, perhaps, high 6,000 millirems but, of course, we dropped that.

We're now in a mode where we're talking about even smaller doses. And what -- so, in effect, we're going to be discussing data and strategies for evaluating exposures post-1973 where, in effect, we're talking about doses that are very

small. In fact, one could argue that --- Jim, remember you did that dosimetrically significant piece of work where you determined ---

DR. NETON: Yes.

DR. MAURO: --- that 100 millirem per year is from a practical standpoint probably of no dosimetric significance. We're in that --- and I know it was dealing with external exposure.

DR. NETON: John, it wasn't 100 millirem per year, it was 100 millirem total.

DR. MAURO: Oh, okay, my mistake. I just raised that because I think it has some play. Tritium exposure is a uniform whole-body exposure, in many respects it's like an external exposure from that perspective, so this 100 --- here's a place where we want to sort of keep that in our pocket, that the number 100 millirem has been found to be external --- likely to be of no dosimetric significance in terms of affecting change in a Probability of Causation determination. I wanted to just preface the conversation.

Now, we'll get to this post-1973. You

know, after the incident in April of '73, a lot happened. And there's quite a bit that's been written in the documents that are on the web. And anyone who really wants to dive into this, you know, you could read our report dated September 18th, 2014. There's a transcript, and I believe there's a May 30th, 2014 NIOSH report. It's all there. That's basically what's on the record right now.

So, what I'm going to draw upon is the report that we prepared that's dated September 18, 2014. I believe that's the most recent official document that SC&A put out on the subject. And for those of you who might want to follow this along, it's on page 28 of SC&A's September 18th, 2014 report.

And in that section, there are nine issues or concerns. You'll see those concerns regarding the strategy that NIOSH is employing for dealing with this circumstance. And I want to create --- I'm not going to go through each one of the nine. It's just too burdensome. I'd rather try to create a visualization.

The way I understand it, after '73 a lot more attention was paid to tritium possibly showing up and resulting in some exposures. And the way I understand what happened was, there was increased attention to looking at the --- what they call bubblers which are --- the way I understand it, this is a way of collecting tritium, and they're in or near a hood, and they collect tritium that might be on its way out the plant, up the stack. And there's a lot more attention paid to the bubblers as a source of data that will let you know whether there's any airborne tritium around, and that's being exhausted out of the facility.

There was also a lot of swipe samples that were being collected to see if there's any tritium showing up. This is all because of this increased concern due to the April incident. And there's also --- they implemented a program, I call it the "One In Ten Program." This is something that we often call a cohort sampling, whereby one out of every 10 workers who submit urine for, I believe, analysis for plutonium, I think it was plutonium,

is also analyzed for tritium. It's almost like just we're going to grab it, you know, randomly, pick a number and see if we're seeing anybody with any tritium.

So, what we have here is sort of like a new program that's out there to keep an eye out if there's anything unusual happening with tritium. And it's these data that help us to come to grips with how are we going to go about assigning some exposures post-1973.

Now, the way I understand it is in post-'73, there are two sets of circumstances that you had paid attention to, NIOSH. One is that there was what I would call a chronic ongoing potential for exposure to workers that based on the data that you have collected, the answer is less than 1 millirem per year. But then a little bit of a monkey wrench is thrown into this. There was a minor incident in August 1974 where there was some release, so you have to come to grips with that. And those are the two sets of circumstances and sets of data.

And, by the way, when the 1974 event occurred, there were bioassay samples collected, I believe, in a timely way. You know, you're not confronted with the same circumstance we had with the April '73 exposures. So, what I understand we have here is --- and correct me if I'm wrong.

The plan is this, for those workers post-'74 that were involved in the August 1974 incident, I believe that you calculated the exposures as being .15 millirem from that single incident. Is that correct?

MR. RUTHERFORD: That's correct.

DR. MAURO: That would be the doses that a number of workers would have experienced from that 1974 release, a very, very small dose.

MR. RUTHERFORD: That's correct.

DR. MAURO: I have that correct, but I wanted to make sure that that was the number. And then --- but, of course, there are other workers that were not involved in that incident. And, certainly, you move on to 1975, and 1976, and so forth, the general sense is that there's data now.

Now, we take the 1974 incident out of the picture for a minute now. Now you're saying okay, what does the data, there's the "One In Ten" sampling, the bubbler sampling, the swipe sampling tell us? And my understanding is, the story that it tells us is that the doses to all these workers were less than 1 millirem per year, so for all intents and purposes they were zero millirem per year. And this is what the strategy is for assigning exposures post-1974.

Did I fairly characterize that as being your --- the strategy you plan to use?

MR. RUTHERFORD: Yes. I think that's pretty good, John.

DR. MAURO: Okay, thanks. All right. Now, then I go on now on my --- given that strategy, on page 28 of the September 18th, 2014 SC&A report, I identified these nine issues. And I want --- and here's where ----recognize that we're talking about doses that are very, very small, so I think all I'm really saying is the logic of the problem and the strategy that's been adopted where there

may be some limitations in it, and where there may be some problems.

One problem is, from reading all of these SRDB reports, there was a whole long list of them, and I read through them. And what emerged from that was one of the problems is that --- is where the bubblers are. All right? Picture a 55-gallon drum, I believe, or some container shows up. It could be scrap plutonium, it could be pits, and what happens is, I think the 55 --- inside the 55-gallon drum --- it arrives and a worker is there. And it arrives, and it's placed at a location near where there's a bubbler. And the worker opens the can, 55-gallon drum, and if there's any tritium that may be associated with that particular shipment, it'll come out, and it'll go up and be captured by, I guess, the vent of the hood, go up through a bubbler and be detected. So you'll know we've got ourselves a container that is contaminated, so I think there's a degree or control there, that says, you know, we're paying attention now. We're opening them by the bubblers.

But then I understand that one of the other things that's done is inside the 55-gallon drum, the guy reaches in and pulls out smaller containers that contain material. I'm not sure what kind of material is in there, but the plutonium is inside another container that was in the 55-gallon drum. He picks that up and he brings that someplace else. Okay? Stay with me. And, certainly, correct me if I've got this movie in my head incorrect. So, he walks away and he goes to someplace where there's something called a down draft table, where he opens up this other container. And in theory, there could be tritium inside this other container that could come out. But in that case, it's not going to be captured by the bubblers, okay, because where he's taken the smaller container, there may not be bubblers nearby.

So, one of my concerns --- and I'm not saying this is of great import, but I think that the bubblers give you a certain amount of information, but it's a very good possibility that the guy that carries the container over to another

location, the bubblers are not going to catch that. They're going to miss that. So, somehow the person could have experienced some exposure that the bubblers didn't pick up.

Then I say to myself but, okay, but you've got this one-in-ten sampling program, this sort of cohort sampling program where people's urine are being grabbed randomly, one out of every ten workers. But it's my understanding when you look at that data, it's really spread out. In other words, you don't have a --- for example, urine samples that are taken, let's say once a month from some group of workers. It ends up being more like on the order of one sample a year for a given worker. And what does that tell me? It tells me that you're going to have to get -- you know, if there are people that are --- had a tritium intake, the one in ten program could very well miss that. Maybe not all of them, but apparently the one in ten program, the results show no one got anything detectible above 1 millirem per year.

So, my takeaway is, on the face of it,

the bubbler samplers, the one in ten urine sample bioassay program, swipe samples, on the face of it look like a lot of attention is being paid to it, but then when you think a little bit more about, you know, where the bubblers are located, as opposed to where the workers are, and the bioassay sample being really a very infrequent sampling, that it's very easy to miss exposures. So, there may have been exposures going on that might be, you know, above 1 millirem a year, maybe not very much above 1 millirem a year.

That approach to sort of keeping an eye on things is really not very good, so my --- I'm at page, I mentioned earlier, those nine comments. They basically go toward that with two additional questions, and then I'll stop. The two additional questions have to do with the efficiency of the bubblers themselves.

When I hear about bubblers, I picture air flowing through water that --- and the tritium will stay, become tritiated water and stay with the water, but you don't know the efficiency unless you

have another bubbler after it that is connected to it downstream, and then you look at that. So, I'm not quite sure if the data that you're getting from the bubblers you have a good idea of what the efficiency is. I haven't read anything in those SRDB reports where the efficiency of the bubblers has been demonstrated. And, usually, you do that by having two bubblers in sequence. That's one question that's sort of layered on top of the story I just told.

And the second question is, I ran into some language that appears that there was some metal tritides associated with what was handled at the facility. And, of course, as we know, metal tritides are a lot different than tritiated water or elemental tritium. And I'd like to hear a little bit more about tritides and how that fits into this idea that really other than the 1984 --- I'm sorry, the August 1974 incident, how does that play out, the idea that some of this might have been tritides? The bubblers may not be very good in terms of capturing things, capturing where the exposures

were. And the urine sample, the one in ten urine sample program may, itself, provide you with information that could be a little bit misleading because of the way in which it's spread out. And that really is the essence of those items that are listed, one through nine in the report that I cited earlier.

MR. RUTHERFORD: Okay. John, a couple of things. First, and I'm going to get Jim Bogard in on this here in a minute, but the one thing, post-'73 incident, I think that, you know, just the idea of bubblers fixed locations in the exhaust plenums, I don't think that was the only air monitoring that occurred. And I'll get Jim to weigh in on that when I'm done.

Also, the --- I think the '74 incident, if you look at it, the individual -- I mean, the monitoring that was in place was there, and it did show that it was able to detect an incident and identify the proper people to ensure that those individuals were monitored. And in that case, the highest exposed individual was less than 1 millirem

so, you know ---

DR. MAURO: Yes, yes.

MR. RUTHERFORD: I don't --- I think that was a very good example where they picked up the monitoring program. They went through a two-year period with this increased monitoring program. And, you know, again, I'll get Jim to weigh in on this in a second. And they identified nothing during that two-year period that indicated an additional problem. In addition, one of the main sources of potential exposure was opening up those containers.

That was the other issue. Once they start --- once they identified the issue of opening up containers as being a problem, they instituted shipping requirements on shipping containers to the site, and what -- the maximum amount of activity that could be inside the containers. They implemented a survey program on those containers as they were opened. They actually, if you read the report, at one point they started --- they were sucking air from the containers to try to see what

containers were --- the concentrations were. And that presented a problem in itself, so there was an increased amount of monitoring that was done on the containers, which produced the highest potential for exposure. So, I'll let Jim --- can you add a little bit to the discussion on air sampling?

MR. BOGARD: Yes. The containers were opened at a down draft table, and after 1973 they did have tritium monitors in the work area near that down draft table. So, the hoods weren't the only places where bubblers were located.

DR. MAURO: That's --- let me --- I'm sorry to interrupt, but that's an important point that was not immediately apparent to me. So, not only was there the 55-gallon drums, the bigger drums were opened, they were close to bubblers for sample collection. But you're saying, in addition, the smaller containers, like 10-gallon, whatever they were, there were two of them. When they were lifted out of the 55-gallon drum and brought elsewhere. And I understand was brought to what's

called this down draft table, it was my understanding that the --- when they opened --- now, in theory one could say that the big 55-gallon drum, maybe there wasn't very much coming out of that drum when it was initially opened near let's say a bubbler. But then they --- then later they open up this other container, these two that were inside, and my concern was when they opened that, the tritium might be in there, and could come out at that time, but there were not any bubblers nearby. But you're saying yes, they were. And that I'd be corrected if that's the case.

And then I understand what you are saying is really they had pretty comprehensive coverage of having bubblers where the potential for exposure existed, whether it was when you were opening the 55-gallon drum, or when you were opening the small 10-gallon drums. In both circumstances there were bubblers nearby that were being --- where tritium would have been picked up. And it's that program that caused the 1974, the August 1974 incident. Is that what I'm hearing?

MR. BOGARD: Yes, that's correct. They started putting those out in the work area after the '73 accident.

DR. MAURO: I see. Okay. You know, I have to tell you, when I read the --- you'll notice if you folks read my report, when I -- and I sort of summarized about a dozen SRDBs. And one of the messages that came out of that, to me, was that that wasn't the case. Now, I'm not saying I'm right. Please bear with me, but it appeared to me that there was --- that therein lied a hole in coverage for tritium exposure. But if that's not the case, that's not the case.

MR. BOGARD: Yes. But, of course, we were using this incident as a model for pre-'73, when the assumption is they did not have tritium bubblers in the workplace.

DR. MAURO: Yes. I don't want to talk right now about pre-'73, a whole other story. I just want to get a sense on post-1973, the fact that you're concluding that the doses were really zero per year to everyone except for this --- and even

this 1974 incident, you're saying that this August 1974 --- so, even then the highest exposure was less than a millirem due to that incident. So, it's all based --- so, I mean, so your takeaway is that really no one received any exposures post-1973. And the reason being all of these provisions that were made to keep an eye on things.

And all I'm trying to bring up in my nine items in my write-up is that, well, there may be certain places where the coverage was pretty soft, and it's very possible that there could have been exposures that were missed. And I don't know, you know, what the magnitude of those might have been. Probably pretty small, but if the bubblers were, in fact, catching everything, you know, all the workers that were opening these containers and working with this material, if there were bubblers there, there were bubblers there, and you got your data, and you're sitting pretty strong. But I've got to tell you, the SRDBs did not read that way.

MR. BARTON: John, this is Bob Barton. Can I ask a clarifying question here? Because my

read on this was that --- and I might be confused, but the decision not to assign anyone any tritium dose after 1973, the way I read it was that a coworker analysis was done on 1974 and 1975. Now, was it just restricted to those two years? I guess I'm posing that to DCAS.

MR. RUTHERFORD: Yes, it was, only because the amount of bioassay after 1975 didn't support really adding those. I think, and Liz can --- well, Liz may be able to correct me, I don't know. But I believe there was 11 bioassay samples or so after '75 that could have been used, and they didn't really fit for the coworker model.

MR. BARTON: But when we talk about coworker model, are we talking about actually doing sort of a best-estimate fit to each individual worker, or is it the sort of standard model where --- well, you calculate an OPOS result and you fit it to a distribution, and you pull off some percentile, and then you calculate the intake? I'm curious how that was done.

MR. RUTHERFORD: Well, it was

definitely not done in accordance with the new IMBA guide, if that's the question. But I think --- I don't know if Liz or Mutty can comment on that or not.

MS. BRACKETT: I'm trying to look quickly. I don't know if Mutty knows off the top of his head. I believe that we did this the same way we've done others, and that's doing each one individually, and then coming up with the --- you know, using the doses rather than the individual results. But I'm trying to find that right now.

MR. RUTHERFORD: Now, that's what I remember was done.

MR. BARTON: I mean, we have the data set, you guys provided that to us.

MR. RUTHERFORD: I was going to say, we provided that to you guys.

MR. SHARFI: This is Mutty. Liz is correct, that they assessed every individual, got their dose, and then they looked at the distribution of all the individual doses and they were all less than a millirem.

CHAIRMAN KOTELCHUCK: They were all what?

MR. SHARFI: This is separate than the one in ten program.

MR. RUTHERFORD: No, this was actually taking that one in ten --- those individual bioassay samples, those individuals that were monitored, looked at their dose, and then established a distribution based on that.

DR. MAURO: But am I correct, that one in ten program really effectively resulted in one urine sample per person per year? And you could understand why I would be concerned if that, in fact, is your data set, because of the half-life of tritium, the effective half-life of tritium, where you wouldn't expect -- I mean, you'd have to get pretty lucky. You'd have to catch a guy that a week ago was exposed, you know. When you did pull that sample, I --- that was my understanding, that the one in ten sounds good, but when you look at it a little closer, you find out you're really only pulling one urine sample per person per year. And

do you really expect to pick anything up with something like that, if that's the data you're referring to?

MR. RUTHERFORD: And off the top of my head, I don't disagree with what you're saying. It does --- and when you look at it closely, and if it is one sample per person per year. However, the other evidence that was used, the increased air monitoring surveys, and the smear surveys, and all the other things that point to the same result kind of give you, you know, a weight of the evidence type of thing.

CHAIRMAN KOTELCHUCK: There's one -- effectively, one monitoring per person per year. How many persons were monitored?

MR. RUTHERFORD: I think there were --- is there 250 samples on that?

MS. BRACKETT: Well, I have a file that it has 75.

MR. RUTHERFORD: Okay, 75.

MS. BRACKETT: It looks like they have 75 individuals. And what was done with that, it does

look like most had --- if not all had one sample per year, and it was assumed that that was their excretion rate for the entire year. So, it was assumed that there was a constant chronic exposure throughout the year.

CHAIRMAN KOTELCHUCK: But if there was a spike, you would expect the spike to show itself up in one of the 75. Not looking at one person, looking at the population that it's essentially a random sample of ---

DR. MAURO: Well, collectively, you would argue that if something was going on, at least one of those 75 people, you'd get a hit.

CHAIRMAN KOTELCHUCK: That's right, one or two.

DR. MAURO: I hear that argument. I could see some merit to that argument. You know, without doing the statistics, what's the likelihood that something big could have happened. Not big, but something could have happened and you missed it, you know. I don't know.

MR. BARTON: Well, John, there is one

worker in this database that sort of gives me pause. And we're talking about 1978 now, so this is a little further down the line, but essentially the first samples of this worker in 1978 is at the beginning of April. And it's almost 120,000 picocuries per liter, which is like four times higher than what you saw in those 1964 samples, I believe. So, I mean, there is at least some spikes in here that that particular worker might be worse, you know, doing the best estimate approach. I assume it's TIB-11, I guess, is what was used to come to the conclusion that all the doses were less than 1 millirem?

MS. BRACKETT: No. TIB-11 would assume that only the --- only that one result would have been collected at the time that they were potentially exposed. As I said, we assumed that they were exposed at that rate for the entire year, and that would not be the TIB-11 assumption.

MR. BARTON: Okay. This worker can have several samples. It looks like they were on a monthly tritium schedule ---

MS. BRACKETT: Okay.

MR. BARTON: --- for '78. And prior to that April sample, in the previous year there were samples in October. So, I mean, there's a pretty big gap before you saw that one spike sample. It sort of seemed like they put them on a monthly schedule after that, maybe. I can send you the claim number offline if you want to take a closer look at it.

MS. BRACKETT: Okay. But you said that their result was four times larger than the ---

MR. BARTON: It's 117,000 picocuries per liter.

MS. BRACKETT: I don't remember what the other --- what the magnitude of the others were, but ---

MR. BARTON: I thought they were around 30,000. That's why I started looking at that number.

MS. BRACKETT: Okay.

MR. BARTON: Yes. I mean, I'm looking at the report. I guess it's SRDB --- I don't have it

marked down here, but there's essentially a table that lists the individuals that were above 10,000 picocuries per liter. And the highest one in that table is 32,000, but the one I'm looking at is 120.

MS. BRACKETT: Okay. So, but we're getting less than a millirem dose, and four times that is going to be, you know, 1.5 millirem, 2 millirem.

DR. MAURO: If I remember ---

MR. BARTON: Well, depending on when you assume the intake occurred, though, I mean, if you're assuming it happened right before they took the sample, and that might be borne out by the subsequent samples months afterwards. And you might very well be right, but if that intake occurred in some other method, an acute sample a month before, two months before when there was no sampling available for this worker, then it may not. It may actually get you over to where you have a measurable dose above 1 millirem, but I don't know, because I don't think that calculation is done.

DR. MAURO: Am I correct as a rule of thumb, this is --- I remember doing this. If you have chronic concentration of 10,000 picocuries per liter all the time in your urine, that means you're being chronically exposed at about 1 millirem a year? I think that was about --- that was the rule of thumb I've been operating under. It helps to give some meaning to the numbers we're throwing around right now.

MS. BRACKETT: I'm not familiar with the rule of thumb on this.

DR. MAURO: That's --- I remember doing the calculation while I was working on my report, and that sort of sticks with me. And I read it the other day, and I think that's about right.

CHAIRMAN KOTELCHUCK: But I thought the one in ten worker sample for plutonium only occurred in '74 and '75, and then was ended.

MR. RUTHERFORD: That's correct. And then the others would be sampled because there was a reason to sample them, basically, or they were --- what they call this is, if they were in a

situation where there was a potential for tritium exposure, and they may have identified ahead of time that those individuals will be on a tritium monitoring program. So, in that case, that individual was probably identified as being an individual that could be exposed in 1977 or '78 and placed on that program.

CHAIRMAN KOTELCHUCK: Okay.

MR. RUTHERFORD: Which is consistent with, you know --- the reason, you know, the idea they cancelled the program '74 and '75, after '75 they weren't finding anything. They had established controls in place in the workplace. They felt those controls were doing an adequate job of identifying potential exposures, and so they stopped the individual monitoring program.

I think the one thing I can do, John, just to --- again, I mean, I think we all agree these doses are very low. I think we can go back and actually do a little additional write-up on the bubblers as respect over time post-'73 in the workplace, and give you a little better feel for

that.

DR. MAURO: And, also, if you can look a little bit at the efficiency of the bubbler, and also the issue of tritides. Those are really --- you want to break all this thing down, and you say well, what are we talking about post-'73? Well, we're saying, are the data that's being collected adequate for you to judge that really there's no exposures, and the nature of those samples that we just talked about. And that would be like question number one.

Question number two would be well, what is the efficiency of those bubblers, because we're putting a lot on that. And, finally, what about tritides? They seemed to have showed up in the SRDBs, and where does that fit into the picture?

So, if I was to say the three general subjects that I'd like to hear a little bit more about would be those three. And, of course, embedded in the first one has to do with the one in ten program, the location of the bubblers and how representative they might be, sort of all

clustered together.

MEMBER MUNN: What kind of tritium exposure do we really --- could you ever have gotten from tritides?

DR. MAURO: Well, in a urine sample --- if you take a urine sample and you detect tritium, and in one case the tritium you're detecting is from tritiated water, the other case, the tritium you're detecting in the urine is from hafnium tritide, the difference in the whole body dose is a factor of 10,000. So, an enormous difference.

MEMBER MUNN: Yes, but I'm trying to very simplistically in my own mind identify what kind of tritium exposure would result from the presence of tritides. I have no feel for what activity was involved. I don't mean radiological activity, I mean I don't have any feel for what kind of work activity was involved ---

DR. MAURO: Oh, okay.

MEMBER MUNN: --- with tritide metals in the plant during that period. What were they

doing?

MR. FITZGERALD: Well, I think metal tritides had a weapons complex application, but that application was in a sealed component in every place except for Mound and Los Alamos. So, one would expect that to be a sealed component at Rocky.

MEMBER MUNN: Which means they weren't really and truly ---

MR. FITZGERALD: Well, you have some residual tritides in locations, because it's just a particulate form of tritium. I'm just saying that from an application standpoint you would only expect to see non-sealed tritides, like hafnium tritide at Mound and at Los Alamos, were the two locations I'm familiar with.

MEMBER MUNN: I'm trying to get a feel --- you know, I'm trying to see ---

MR. FITZGERALD: Yes. Operationally, you would see them in those two locations in the weapons complex. Everywhere else they would have existed, but in sealed components.

MEMBER MUNN: But I'm thinking that the

tritium is being so closely bound to the metal. That's what I ---

MR. FITZGERALD: No, it was -- without getting into anything sensitive. It was just the form it was in, that it was useful.

MEMBER MUNN: Well, yes, but I'm speaking in exposure terms here. So, you have tritium bound ---

MR. FITZGERALD: Yes, certain tritides were very insoluble and, therefore, would not have been picked up as you would pick up normal tritium in urine.

MEMBER MUNN: And that's why I'm asking this question. What kind of exposure ----

MR. FITZGERALD: Well, the first question is, would you have a form of tritide that would be so highly insoluble as to not be picked up in urinalysis.

MEMBER MUNN: That would create some kind of exposure route. And I'm trying to imagine what that would be, other than just soft beta external exposure.

MR. FITZGERALD: Yes, it has an internal issue but, you know, two questions. I mean, where does it exist in that form and would it be available for exposure? We beat this to death at Mound, and even if you do have it for exposure, the actual exposure amounts to a millirem. It's still a very small exposure.

MEMBER MUNN: Even fractions of a millirem.

MR. FITZGERALD: Well, it's --- even though it's not easily detectible, the implications are not as great as ---

MEMBER MUNN: I guess I can't see any probability of danger, of physical danger as a result of what I've been shown ---

MR. FITZGERALD: Well, I think the first thing is, does it exist in an insoluble form and available for exposure at Rocky.

MEMBER MUNN: Yes.

(Simultaneous speaking.)

MR. FITZGERALD: You asked potentially that question first.

MEMBER MUNN: I guess that's the bottom line question I'm driving at.

MR. FITZGERALD: Yes, that's the question you answer first, because beyond that, you know ---

MEMBER MUNN: The answer is not to worry. It is not going to affect what we have to do.

MR. FITZGERALD: Well, yes. The answer to the first question will determine how far you go with it.

MEMBER MUNN: Okay.

MR. RUTHERFORD: And I think we're --- again, we're all in agreement the tritium exposures are low. I mean, if they --- you know, and this is an SEC period, so I just want to remind everyone. We will go back, we will look at the efficiency of the bubblers, and we'll also look at locations and try to get better documentation on the program for that period. And we'll look at the tritides, as well.

DR. MAURO: Yes, that's what I'm asking.

Thank you. You summarized it very well.

CHAIRMAN KOTELCHUCK: Okay. Does that close this part of the discussion? Unless there's from Working Group folks, any further comments?

MEMBER MUNN: No. It looks like the next meeting's agenda is pretty well laid out already.

MR. RUTHERFORD: Well, we were going to have another meeting, anyway, on a couple of other things, so we might as well talk about that, too.

CHAIRMAN KOTELCHUCK: Okay. That's good. So, then we should go to the pre-'73 exposures. Anticipating something, should we stop for 10 --- it's 2:30, stop for a few minutes, or just keep going? Keep going. Okay, I hear.

MR. FITZGERALD: Yes, let me jump into it. This will, I think, go more straightforwardly.

MR. RUTHERFORD: Yes, I agree.

MR. FITZGERALD: The issue for pre-'73 is just simply they didn't recognize tritium as a source term of concern to monitor for radiation protection reasons at Rocky Flats. It just wasn't something that was on their screen, so there wasn't

any routine monitoring program. There were some limited bubblers, but nothing that would produce routine results.

And the approach that NIOSH took, a reasonable approach was to pick the 1974 event, the August event as a fairly prominent shipping container release, and to use that as --- represent that as typical and bounding of all the other container releases that may have occurred at Rocky Flats before 1973. Again, I think it wasn't certainly as high as the '73 event, which was sort of a spike and a once-only type event at Rocky, but it was considered typical.

The approach I took was, frankly, to go through the factors that were presented as supporting that particular -- because, again, what we're doing is retrospectively applying a value for all previous years. So, that's usually one where you want to be careful to have something that is representative. And I took the six supporting factors, now on page 30 of our paper, and the analysis is page 30-35 of the September paper. And

I think there was a series of factors, which I think are all very good key supporting factors that have to be satisfied. I kind of critique each one as far as how it --- whether it supported the application of that 1974 event.

And the first one I looked at was whether or not the background tritium levels before the August '74 event, whether they were pretty well defined and represented typical background levels. And the issue I have there, and it's detailed in the paper, is that my concern there is that they did establish in the investigation that followed the August event that there was a clear cross-contamination involved with the buildings and the rooms that were involved in the '74 event. And this came from, apparently --- and this is, again, from the investigation report. It apparently came from the '73 event, that once they got tritium in the building, it was everywhere, which is not too surprising and was, in fact, in the lines and in the plenums for these facilities. So, when they were doing some baseline measurements

in and around the --- before and after the '74 event --- I'm only raising that to question whether, really, there was a clear background level for Rocky after the '73 event, because you just had some fairly widespread contamination. So, that would be a question that I would certainly raise in terms of background.

MR. RUTHERFORD: Quickly, on that one.

MR. FITZGERALD: Yes.

MR. RUTHERFORD: I mean, I kind -- I see that as more of potentially, you know, increasing the potential release of the '74 incident than, you know, by giving you that --- because, I mean, it kind of sounds like you're implying that we really didn't know the background levels, you know. Because we said everything was fairly well close to background when this event occurred, but you're talking about the actual, you know, the lines, exhaust lines, and things that were internal that could have potentially masked or contributed to the event.

MR. FITZGERALD: Yes. I'm just saying,

you know, I think the whole thing comes down to how representative are the parameters in '74 to ---

MR. RUTHERFORD: Okay.

MR. FITZGERALD: Previous to '74. You know, this thing can swing both ways.

MR. RUTHERFORD: Sure.

MR. FITZGERALD: And they're saying, yes, actually the '73 event did screw up the background to some extent beyond that and, therefore, one has to consider that before you ---

MR. RUTHERFORD: Okay.

MR. FITZGERALD: --- establish that you have a representative background. I'm not even sure what a representative background would be after the '73 event.

On the second one, the quantity of tritium released was significantly less than the '73, is more typical of potential undocumented releases in work areas. And then this question of identifying six documented releases from '68 to '74 average of one per year.

This one gave me some pause because,

again, we're talking how representative is the '74 event? And my concern there is that you had --- in terms of source term you had a pressurized container being opened with Battelle parts, where there's some evidence of contamination of the container. You had a workplace configuration in terms of ventilation, in terms of controls that had been beefed up considerably from what it was prior to '73. So, in terms of the source term, I'm not even sure we --- Rocky had a good feel for what the source term was once they unpacked the 55-gallon drum and got the interior pieces out. There really wasn't any monitoring of the interior. They did do some monitoring on the 55. When that went into the glove box, the workers actually, based on interviews, handled that directly, and there wasn't any monitoring to base whatever the source exposure was when that went into the glove box. And they handled hundreds of these. These were the pits coming -- returned from Rocky and Burlington in hundreds.

So, in terms of source term what gives

me some pause is that even though the release in '74 was a large number, and just on that basis I'd say well, you know, probably bounding but, you know --- but the question is how representative would it have been for the kind of releases we're talking about. You know, I don't think the six incidents that we do have records for really characterizes the many, many returns that Rocky had from Burlington and Pantex. I think that's sort of an unexplored area ---

MR. RUTHERFORD: Well, I agree with that.

MR. FITZGERALD: --- so the source term, you know, I think --- I'm comfortable with it being a large number. I'm not comfortable with it being characterized as representative, and whether it's bounding, you know, I could probably convince myself.

CHAIRMAN KOTELCHUCK: It is certainly --- I mean, it sounds like you're saying it is bounding; that is to say, it's way above what people used to be getting.

MR. FITZGERALD: Well, I'm just saying it's a large number, and I could probably speculate that it would be bounding because it's a high number. I don't think we would exceed 1.5 curies as a source term anywhere in the pre-'73. As far as knowing what was in the returns from Pantex and the other facilities, we don't know that. So, you know, again, I think ---

MR. RUTHERFORD: Yes. And I understand what you're saying. I think what we used was we felt like this was clearly a high number. It was one that was an incident that occurred that was what we felt would provide the most likely chronic exposure scenario. And what, actually --- I think when you looked at the controls and stuff that were put in place afterwards were to focus on that very type of thing that potential contaminated containers and the return of pits and so on. So, I think we felt like that number, one, was high, and it was an exposure scenario that was more typical of what the individuals would see on a chronic basis. Now, whether 1.5 is right or one is right, or .8 is right,

I don't know.

MR. FITZGERALD: But it is claimant-friendly.

MR. RUTHERFORD: Well, yes. I think the issue ---

(Simultaneous speaking.)

MR. FITZGERALD: Well, the issue, I think you have this dichotomy. You always go through this, you know. Is it sufficiently conservative to be claimant-favorable and bounding? Is it sufficiently accurate or representative, because otherwise you can pick a large number and be done with it in every case. So, in this instance, are the conditions that you -- looking at the conditions of the container handling and opening, is it sufficiently representative of what preceded '73 for those years, 16, 17, 18 years the returns.

Two things come into play. One, you know, what are we talking about as far as the release itself of source term? And, certainly, that's large, certainly not as large as '73 ---

MR. RUTHERFORD: Right.

MR. FITZGERALD: --- but large enough.

MR. RUTHERFORD: Yes.

MR. FITZGERALD: The second thing is getting into what kind of controls you had in place. And we had a healthy debate about that.

MR. RUTHERFORD: Oh, yes.

MR. FITZGERALD: And the situation was, were you getting more controls, more mitigation out of '73 such that that '74 event wouldn't resemble how the returns, the other containers were handled prior to '73. In other words, you had many, many hundreds of containers that were opened. In those days, tritium wasn't recognized, and typically they got a 55-gallon drum, opened it up. They did some monitoring, some bubbler monitoring at that point, but then they opened the inner container and literally put the returned pits right into the glove box, so there was a potential for exposure. If exposure was going to take place, it probably took place then. We don't have any good measurement on that, so the issue is after '73, you know, a rigor

was instilled in the way containers were opened at that point where you had a down draft table, you had monitoring, active monitoring going on, RCTs. I mean, it was a much different picture.

Now, Pantex, as far as the senders go, they didn't come around to changing the actual practice until later. But as far as Rocky went, they had procedures in place because they kind of got hit with this and, therefore, they were protecting themselves. So, they instilled a lot more rigorous practices.

So, when we're comparing the two, you know, you have a couple of questions. One of which is, is the number conservative? Certainly, it's conservative as far as the source term. Is it representative of what happened before '73 in terms of rad controls, practices, monitoring? It was not.

CHAIRMAN KOTELCHUCK: But I'm less worried about overestimating a small quantity, I mean, a small exposure. We're dealing with some very small exposures, and if we're fairly heavily over-estimating where it's not going to affect

--- no, we're not doing --- let's just say, I don't worry about over-estimating on a very small quantity on something that is going to result in a very small dose. That's all.

MEMBER MUNN: Yes. The difference in .8 and 1.5 millirem is quite different than the difference in 8 millirem and 15 millirem. Right.

CHAIRMAN KOTELCHUCK: Exactly.

MR. FITZGERALD: So, anyway, this analysis goes through and looks at the factors involved. And, basically, I think the conclusion is it wasn't representative, and wasn't necessarily typical, but we're not going to argue that it is a large number. So, if the Work Group is comfortable with a large number, we can go that way.

CHAIRMAN KOTELCHUCK: Yes. I'm not -- your charge was to critique it in terms of what is correct, what is most nearly correct.

MR. FITZGERALD: The question of typical and bounding.

CHAIRMAN KOTELCHUCK: Yes.

MR. FITZGERALD: And I think we concluded it certainly looked like it would be bounding, but it wasn't typical.

CHAIRMAN KOTELCHUCK: Yes.

MR. FITZGERALD: There's the answer.

CHAIRMAN KOTELCHUCK: Right. Yes.

MEMBER MUNN: But there is an enormous difference at the low end, as opposed to at the high end.

CHAIRMAN KOTELCHUCK: Yes.

MR. FITZGERALD: Yes, for sure.

MEMBER MUNN: With its affect for the claimants.

CHAIRMAN KOTELCHUCK: Right.

MR. KATZ: Do you want to just check in with Bill, too, since both you and Wanda have spoken about this?

CHAIRMAN KOTELCHUCK: Right. Bill?

MEMBER FIELD: Yes, I think it's sufficiently bounding but not unreasonable.

CHAIRMAN KOTELCHUCK: Okay, yes.

MR. KATZ: So, that's an item we can

close.

CHAIRMAN KOTELCHUCK: But let me -- let you finish --- I mean, do you have more that you want to say? I mean, I ---

MR. FITZGERALD: No, I think, you know, I went through the factors in terms of the question of representation, how representative it was. I think it's all laid out here. I'm not sure I need to ---

CHAIRMAN KOTELCHUCK: Fine. Excellent. No, I just ---

MR. FITZGERALD: Yes.

CHAIRMAN KOTELCHUCK: --- didn't --- I hoped we were not cutting you off.

MR. FITZGERALD: No, I think you grasped the essence of it, which is the ---

CHAIRMAN KOTELCHUCK: Right. And we're in agreement so that this issue, I think, is closed now for this Working Group.

MEMBER MUNN: I think so.

DR. MAURO: This is John Mauro. I just want --- one question that's been lingering with

me. It seems to me that there's a connection between the post-'73 data and understanding of the kinds of exposure that may have occurred, and the questions I raised just a moment ago. And I believe that the --- that you're drawing upon that experience which was that .15 millirem per event, the August 1974 and you're going to say well, let's just assume that that kind of experience happened every --- once a day pre-1973.

Is there a linkage --- I mean, given that rationale, and I understand why you would say, geez, that's pretty conservative, but is there any more to the story in terms of when we get a richer and more complete understanding of the post-'73 circumstances, let's say regarding the bubblers, and their location, regarding tritides and their existence or non-existence and that sort of thing, and the adequacy of the one in ten urine sample. The collective knowledge that we get from that, does that have any bearing on our judgments regarding how we're going to deal with pre-'73?

MR. RUTHERFORD: Are you asking me?

DR. MAURO: I guess I'm asking everyone if there's ---

MR. RUTHERFORD: Well, I could comment on ---

DR. MAURO: Is there a linkage?

MR. RUTHERFORD: Again, I think the difficulty, the things that occurred post-'73, you know, we made our case with the '74 incident as it being a good example, or an example; I won't say good example. I'll say an example of an event that causes a chronic exposure. And, you know, recognizing that, you know, the controls that were put in place after that point, obviously, were put into place to limit and minimize the exposure to personnel which, you know, those controls were not in place pre-'73. But I think what we've said is the source term we've used and taking a, you know, one event per day, and knowledge of thinking about, you know, the chances of tritium exposure, you know, from a chronic exposure standpoint are more in contaminated containers than they are in pit returns. If you know the history and know what

occurred, you know, at the various sites. Getting things from Los Alamos were much different than getting things from Pantex. So, I'm just leaving it at that. So, I think that this is a reasonable over-estimate of the exposure for those early years.

But, you know, John, again, if we find out new information that we think, you know what, we may need to refine this, or we may need to look back at this, we can always do that.

DR. MAURO: I really appreciate it. Thanks very much.

MR. RUTHERFORD: Okay.

CHAIRMAN KOTELCHUCK: Well, then we are ready on Item 6.

MR. RUTHERFORD: Do you know what Item 6 was?

CHAIRMAN KOTELCHUCK: Item 6, the ---

MR. RUTHERFORD: Oh, yes. Okay, yes.

CHAIRMAN KOTELCHUCK: NIOSH staff provide status and schedule for remaining open issues, and also associated with data

falsification, destruction and exposures from the critical main source.

MR. RUTHERFORD: Okay. The two other open issues that we have that we're looking at has been data falsification and destruction. This has taken, and I'm sure that Terry, the petitioner will agree and will probably talk about, it's taken a long time.

One of the concerns that was brought up was that during the FBI raid, that there was an identification of potential data falsification or destruction of records. We have done an enormous number of interviews. We've interviewed individuals that the FBI agent in charge, Mr. Lipsky, who had identified, we've interviewed a number of individuals that were in his documents. We've looked --- identified or interviewed individuals identified by the petitioner, individuals identified by people that we interviewed, we've interviewed, so we've interviewed a lot of people on this subject.

One of the things that was holding this

up was there were a number of documents that were provided to us by Mr. Lipsky early on, and when our review of those documents, it was not clear that the FBI had formally released those documents for public use. So, our general counsel recommended that we go back to the FBI and get an official release from them. This took a considerable amount of time. In fact, we did not get released until sometime December/January time frame.

There also --- and in that process, we had thought that the FBI was controlling all of those documents. There is actually --- the FBI came back and released eight or ten documents, or whatever it was. And they said you need to go to the other agencies to get their official release on those. So, now there's a few documents we're getting --- we have to get released from EPA. I honestly do not think that's going to take a long time, because I don't think EPA is going to be as difficult as the FBI was on this.

So, as soon as we get the release of those documents, we'll be able to finalize our

report. I know we have done a lot of work on that in drafting that, so I hope to get that report --- I can't really give you a date because of getting that EPA release.

And the other document is the Critical Mass Laboratory. The Critical Mass Laboratory, we were --- this was actually identified, again, by --- through the petitioner, actually, as a potential issue. Critical Mass Laboratory at Rocky Flats took assemblies and such to, you know, the criticality level, so we're looking at activation and fixed --- fission products, potential exposures.

Again, we've interviewed a number of people in this --- on this, and looked at a lot of data. And there's a very good history of the Critical Mass Laboratory done by the manager of that facility, with worker input. And right now we're doing some final modeling.

We got in a situation, you know, the Work Group was stagnant for a period of time there, and we got into a resource where we're going to put

resources in certain areas of priority, so the individual who's been working on some of the modeling and work with Critical Mass Laboratory was instrumental in some of the other evaluations that are being presented next week. So, he was tied up with Hanford and some of the INL work, so we're going to get him back on this. And we should, I think in April, I think we have a current schedule of late April to have the Critical Mass Laboratory report out. I will work as best I can to try to get the other report out, but it's going to be tied up with the EPA release of those documents. And at the same time we will work the issues here with the post-'73 tritium exposures. But we ought to be able to get a Work Group in sometime before the next Board meeting after this one coming up.

CHAIRMAN KOTELCHUCK: Try that again, what Board meeting?

MR. KATZ: Well, the next Board meeting is the summer, in July, so it sounds like we could have the Work Group work tied up before July, unless we have an unexpected bump in the road. Data

capture.

MEMBER MUNN: June is a good month.

CHAIRMAN KOTELCHUCK: Okay. Let me understand the --- I've not been --- I don't know too much about the FBI raid, and that whole issue. But if I --- as I understand what you're saying, the FBI documents have been released to us.

MR. RUTHERFORD: Yes, we do have them now.

CHAIRMAN KOTELCHUCK: And they are also official.

MR. RUTHERFORD: Yes.

CHAIRMAN KOTELCHUCK: And they have been gone over.

MR. RUTHERFORD: Yes.

CHAIRMAN KOTELCHUCK: Does that mean that --- and there'll be a report on them.

MR. RUTHERFORD: Yes, it'll be all tied up in that data falsification, the data fabrication report, yes.

CHAIRMAN KOTELCHUCK: Okay. So, there will be a White Paper coming out on this.

MR. RUTHERFORD: Yes.

CHAIRMAN KOTELCHUCK: Okay.

MR. RUTHERFORD: These are two White Papers that we're producing, the data falsification, data fabrication, and a White Paper on the Critical Mass Laboratory.

CHAIRMAN KOTELCHUCK: Okay. And then SC&A will respond.

MR. FITZGERALD: Well, yes, we'll respond.

MR. RUTHERFORD: And you know the other nice thing is that SC&A has been involved with all the interviews in the process so, you know.

MR. KATZ: Can I ask this? I mean, if -- SC&A is behind the curtain just like you are in a sense, so is there any reason why -- is there anything holding you up from getting the paper to SC&A to review before, because the release by EPA doesn't really matter for what we do in-house?

MR. RUTHERFORD: I don't know. I'd have to speak to that internally.

MR. KATZ: I mean, it's all in-house.

MR. RUTHERFORD: Yes. I think that --- I know that when that hold was put on those documents, we did not ---

MR. KATZ: Oh, you couldn't work on it either?

MR. RUTHERFORD: We couldn't work on it.

MR. KATZ: Okay, I'm sorry.

MR. RUTHERFORD: You know, it becomes an issue, in fact ---

DR. NETON: We're not even supposed to have them.

MR. RUTHERFORD: Yes, we're not even supposed to have them. We wouldn't -- our contractor would ---

MR. KATZ: Oh, that's fine. I didn't understand that. I didn't understand that, so sorry.

MR. RUTHERFORD: So, that's kind of the hold up.

MR. KATZ: Okay.

CHAIRMAN KOTELCHUCK: But the EPA is a release, but you have the documents.

MR. RUTHERFORD: We have them but we're not ---

CHAIRMAN KOTELCHUCK: You're not looking at ---

(Simultaneous speaking.)

CHAIRMAN KOTELCHUCK: Okay, that's fine. Are there any other agencies beside EPA?

MR. RUTHERFORD: There's a couple of Department of Energy documents, again, that I don't think they're going to be an issue.

CHAIRMAN KOTELCHUCK: Right. So, basically, you'll give us reports in, what, April, and SC&A will be able to go over them by July.

MR. FITZGERALD: We've been involved in all the interviews, so I don't think there will be a very long review. I think we can turn it around relatively fast.

CHAIRMAN KOTELCHUCK: Oh, good. Okay. Excellent.

MR. RUTHERFORD: And I want to say that the date for the Critical Mass is late April, because I don't want --- I know our contractor is

listening, and he hears us say April, and he's like, oh, gosh, you know, it's late April.

MR. KATZ: It sounds like we could have a Work Group meeting in early June.

MR. RUTHERFORD: Yes.

CHAIRMAN KOTELCHUCK: Early June, that sounds good. And remind me where we're meeting in July?

MR. KATZ: July, we don't know where we're meeting yet.

CHAIRMAN KOTELCHUCK: Okay, good. I'm glad, so that it's not my ignorance, it's that we don't have a place.

MR. KATZ: It's not.

CHAIRMAN KOTELCHUCK: But we have a date.

(Simultaneous speaking.)

CHAIRMAN KOTELCHUCK: We have the date. That's fine.

MR. KATZ: And we'll be talking about that at the Board meeting, where ---

MR. RUTHERFORD: We'll be presenting

our Argonne National Laboratory Evaluation Report.

CHAIRMAN KOTELCHUCK: Which?

MR. RUTHERFORD: Argonne National Laboratory, the West, out of Idaho. We will be presenting that in July.

MR. KATZ: Yes, so we have talked about possibly going to Idaho again.

CHAIRMAN KOTELCHUCK: Okay.

MR. FITZGERALD: Not Oak Ridge?

MR. RUTHERFORD: Oh, yes, we talked about that, too.

CHAIRMAN KOTELCHUCK: So, that finishes that.

MR. RUTHERFORD: Yes.

CHAIRMAN KOTELCHUCK: And I --- it's ten of three. We do have petitioners, and I know that Ms. Barrie said that she wanted at least --- she needed at least 10 minutes. But my feeling is let's go and let's not break. Terrie, are you on the line?

MS. BARRIE: Yes, I'm here. I'm on, and I won't need 10 minutes because I gave part of my

presentation earlier today.

CHAIRMAN KOTELCHUCK: Yes.

MS. BARRIE: And I thank you for that, and I thank you for this opportunity on behalf of myself and the petitioner, [identifying information redacted].

I want to start backwards, I guess, with the last discussion about the Criticality Lab. And I had just located this, LaVon, and I apologize for not sending this to you, either, but it's been within the past week I've located things. And I will send it to you, but it's a document from Lawrence Livermore, and I'll just quote this one thing. You can consider this when you're finalizing your White Paper.

MR. RUTHERFORD: Okay.

MS. BARRIE: It says, an example --- they're talking about a loss of Rocky Flats documents, especially for the Criticality Lab. It says, an example of such a loss might be that which took place upon the closing of Rocky Flats facility. Rocky Flats had assembled a substantial

collection of criticality safety documents. Dr. Rothe has noted that he retained a few of the less well distributed internal documents in his personal collection. Many others, evidently, had been destroyed or dispersed and are now unavailable to be scanned. So, everything that you have there may not be everything that was available.

Which gets into, I guess, the 400 boxes at Los Alamos. You had mentioned, or there was a discussion about whether it's worth going and taking a look to see if there's any documentation on magnesium-thorium plates. And I really appreciate everything that --- all the investigation everyone has been involved with. The reason I sent that little tidbit was because it was a lot more specific information than -- other than Dow Chemical --- yes, Dow Chemical shipped truckloads of this plate. And I really do appreciate that you took it seriously and tried to ascertain, you know, documentation for that.

But I think because of that and this document about, you know, records being destroyed

for the Criticality Lab, that you might want to consider exploring those 400 boxes. There might be documentation that would support the position of the petitioners about, you know, policies not being followed, procedures not being followed, things of that nature. So, I'd just like to throw that out to everyone.

MR. RUTHERFORD: Terrie, I will ----just to add, you know, we did go look at those documents at Los Alamos with respect to exposures from neptunium, U-233, the tritium. We did go out and look at a number of those documents.

With respect to policies, I'm not sure that we necessarily looked at them on that scale, but I did want to let you know we did look at it from the other ---

MS. BARRIE: Okay, great. Thank you. Yes, when it comes to the policies and procedures, it's common knowledge that, you know, just because it was written down doesn't mean it was followed. There was, you know, the philosophy of production over safety, so there was a lot of corners that were

cut. Like I said, it is common knowledge.

I don't know how you can prove that, though, other than the testimony of the workers. And when it comes to the testimony of the workers, what seems to have been ignored so far when it comes to tritium is how frequently the tritium alarms went off. If you remember, there was a focus group back in, what, 2012, where they discussed tritium, and there was testimony from one worker I remember especially, where they would have to hold their breath to go through this one corridor. The petitioner actually mentioned in an interview that there was an alarm that went off frequently in the building that he --- or a room that he had to go into. So, I would not discount their testimony. They were there. They knew what happened. Just because you can't necessarily find it documented doesn't mean it didn't happen.

And when it comes to --- yes, John Mauro mentioned about the location of the bubblers. And I tend to think that he might be right, that the bubblers may not have always been located at the

down draft tables. The affidavit that was submitted with the petition, the original petition, the worker mentioned he was at a down draft table and he drilled into the site return, and the drilling, drilling too far, obviously, and tritium was released. He had a nasal smear. There is no record of a nasal smear, nor did the worker, as far as I know, have a bioassay or a urine sample taken for tritium. So, you know, we might want to take another look at that part of it, too.

As for neptunium, I received an email from, I think it's the [identifying information redacted] that you interviewed, and that's mentioned in the White Paper. She came back with a little bit more information today after the discussion, and I'd like to pass that on to you.

Excuse me. She's talking about ----she got the impression that only five experimental operators are being considered as being possibly exposed, but that would have been --- there would have been a whole lot more workers. She says, and I'm quoting, the ion exchange, calciner, and other

process equipment used in Room 114 and Room 149. These are the two large processing rooms where many other workers would have been present around those special operator people. She's going to go check a little bit more to see if she can get further information for you.

And she also says that she believes the process, the neptunium process was conducted out on the main floor using the same glove boxes and equipment used daily by others, and perhaps by the special operators because it was a relatively small batch operation, and a slightly different process, including extraction of the neptunium.

And my last --- I have papers all over the place here. Wanda had asked about how metal tritides would be formed. And I'm not sure, but I remember reading in SC&A's report something about the hydride process. And there was a hydride process at Rocky Flats, and I believe it was in Building 779. So, that might be another avenue for investigation or exploration to see if metal tritides were there. And I think that's all I have

for today, and I thank you very much for allowing these comments and for everybody's hard work on this.

CHAIRMAN KOTELCHUCK: Very good. Thank you. Thank you. Was there --- on the neptunium, was there --- the comment was five experimental operators. Was that the reference to the five people whose numbers were sampled out of the larger group of people who worked?

MR. RUTHERFORD: No, that was just the project engineer in charge of that process identified that there were five experimental operators that worked on that.

CHAIRMAN KOTELCHUCK: Okay.

DR. NETON: We won't restrict the dose reconstruction to five operators.

CHAIRMAN KOTELCHUCK: Right.

DR. NETON: Anyone who worked with plutonium will get the dose.

CHAIRMAN KOTELCHUCK: Yes, yes. Okay.

MR. FITZGERALD: I mean, I think that's the difference, that we're still talking about

plutonium, neptunium being ---

CHAIRMAN KOTELCHUCK: Okay, good. Well, again, thank you. Are there other folks from the petitioners to speak?

MS. PADILLA: Yes, sir. My name is Judy Padilla, and I have just submitted another --- myself and other people have just submitted another SEC petition just in the past week or so. And I would just like to make one short statement, if you would allow it.

CHAIRMAN KOTELCHUCK: Surely.

MS. PADILLA: In 1993, Federal Judge Sherman Finesilver approved the release of the complete grand jury report for Rocky Flats as a matter of history. Rockwell International pled guilty of the environmental crimes, as well as falsification of paperwork, and paid an $18.5 million fine. Nevertheless, NIOSH used information submitted by Rockwell as viable data when calculating the Probability of Causation for all radiation exposures. NIOSH and DOE, DOL allowed an admitted liar and criminal company to submit

documentation which was very possibly tainted, incorrect, and/or tampered with.

CHAIRMAN KOTELCHUCK: Okay.

MS. PADILLA: Criminal actions, fraudulent and illegal activities, and the omission of the truth in paperwork and deeds is proof that Rockwell could not be trusted to give accurate information concerning nuclear workers' radiation exposure; yet, NIOSH used only data provided by them as the basis to perform the analysis for workers' radiation dose. Can flawed, incorrect, or missing data be used in any scientific documentation? The grand jury report has shown us that any data which was provided by Rockwell International and EG&G should be negated. If you haven't read this grand jury report, I would suggest that you read it. It is now on the internet.

CHAIRMAN KOTELCHUCK: Okay. And that's in your petition.

MS. PADILLA: Yes, sir.

CHAIRMAN KOTELCHUCK: Okay. Well, we will certainly have to consider the petition.

MS. PADILLA: Yes, sir. And please consider the Colorado Federal District Court report of the Federal District Special Grand Jury, number 89-2. And this is as of January 24th, 1992.

CHAIRMAN KOTELCHUCK: January 24th, '92. Okay.

MS. PADILLA: It's a complete redacted version of the grand jury report through 1993.

CHAIRMAN KOTELCHUCK: Okay. Well, thank you for that, and that's an important thing that we have to consider, and we will.

MS. PADILLA: Thank you.

CHAIRMAN KOTELCHUCK: Thank you. Any further petitioner comments? Are there -- let me ask Ted. Can folks from the general public comment?

MR. KATZ: Yes.

CHAIRMAN KOTELCHUCK: If someone from the general public is there, not a petitioner, and wants time, please so request. Hearing none, I think it's time to close our Working Group meeting.

MR. RUTHERFORD: All right.

CHAIRMAN KOTELCHUCK: Okay. So, is

there anything ---

MEMBER MUNN: We'll try to ---

CHAIRMAN KOTELCHUCK: Right.

MR. KATZ: It's a little premature, I think, to establish a date.

MEMBER MUNN: Okay.

CHAIRMAN KOTELCHUCK: Okay. So, Bill, anything? Wanda, anything to say?

MEMBER MUNN: Nothing here.

CHAIRMAN KOTELCHUCK: Okay.

MEMBER FIELD: No, nothing here. Good.

CHAIRMAN KOTELCHUCK: Very good. So, we stand adjourned.

MR. KATZ: Yes, thanks everybody on the line. Take care.

(Whereupon, the above-entitled matter went off the record at 3:06 p.m.)

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