UNITED STATES OF AMERICA
CENTERS FOR DISEASE CONTROL

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NATIONAL INSTITUTE FOR OCCUPATIONAL
SAFETY AND HEALTH

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ADVISORY BOARD ON RADIATION AND
WORKER HEALTH

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83rd MEETING

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THURSDAY, APRIL 26, 2012

The meeting convened telephonically at 11:00 a.m., Eastern Daylight Time, James M. Melius, Chairman, presiding.

PRESENT:

JAMES M. MELIUS, Chairman
HENRY ANDERSON, Member
JOSIE BEACH, Member
BRADLEY P. CLAWSON, Member
R. WILLIAM FIELD, Member
MARK GRIFFON, Member
DAVID KOTELCHUCK, Member
RICHARD LEMEN, Member
JAMES E. LOCKEY, Member
WANDA I. MUNN, Member
GENEVIEVE S. ROESSLER, Member
PHILLIP SCHOFIELD, Member
LORETTA R. VALERIO, Member
PAUL L. ZIEMER, Member
TED KATZ, Designated Federal Official

REGISTERED AND/OR PUBLIC COMMENT PARTICIPANTS

ADAMS, NANCY, NIOSH Contractor
ANIGSTEIN, BOB, SC&A
BALDRIDGE, SANDRA
BARRIE, TERRIE
BARTON, BOB, SC&A
BEATTY, EVERETT "RAY", SR.
BRACKETT, ELIZABETH, ORAU Team
CRAWFORD, CHRIS, DOL
EVASKOVICH, ANDREW
GLOVER, SAM, DCAS
HINNEFELD, STU, DCAS
JESSEN, KARIN, ORAU Team
KINMAN, JOSH, DCAS Contractor
KOTSCH, JEFF, DOL
LIN, JENNY, HHS
LIPSZTEIN, JOYCE, SC&A
MAKHIJANI, ARJUN, SC&A
MAURO, JOHN, SC&A
McKEEL, DAN
ROLFES, MARK, DCAS
RUTHERFORD, LAVON, DCAS
STIVER, JOHN, SC&A

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

(11:00 a.m.)

MR. KATZ: Okay. Welcome, everyone, to the Advisory Board on Radiation and Worker Health Board teleconference. And the agenda for this Board meeting is posted on the website as well as the materials, and such, the agenda, the reports.

There is one document, and perhaps two, one that was just sent late this morning. I'm not sure that that's posted. There's one that was posted yesterday and somehow, I don't know how these things work but, fell off, the posting, and should have been re-posted.

I haven't checked, recently, to see if it's been re-posted, but that's the presentation that's being given today by John Stiver. So that's for all of you online who failed to receive the materials directly because you're not on the Board or you're not Staff.

So let's begin with a Board roll call because we are speaking about a particular site

in an SEC petition, that's the Feed Material Plant in Ohio, or Fernald, as it's known. The Board Members, note your conflict of interest if you have one with this site as we do roll call.

(Roll Call.)

MR. KATZ: Okay then. We have a lot of people on the line so please, everyone who is not speaking to the group, please mute your phones. If you do not have a mute button, press *6 to mute your phone and then you press *6 again to unmute your phone, but please keep your phone muted, except when you're addressing the group.

There is no public comments session, per se, but there is an opportunity for petitioners to discuss the Fernald SEC petition.

And please do not put the call on hold at any point, hang up and dial back in if you need to leave the call. And it's your agenda, Dr. Melius.

CHAIRMAN MELIUS: Okay. Thank you, Dr. Katz. And so I'd like to welcome our two new Members to the Board. If we could get

introduced to them in voice today and then in a few weeks in our meeting -- well, anyways, welcome aboard.

Please, the talking in the background, can you please mute. And, Ted, I think the first agenda item is yours, the votes from absent Members.

MR. KATZ: Right. Thank you, Jim. So at the February Board meeting we had votes on five SEC petitions. There were two Board Members absent for those votes and I'm recording their votes now. That's Dr. Lockey and Dr. Poston.

Both Lockey and Poston submitted their votes by March 23rd and they both voted in the affirmative, with the rest of the Board, for all of the petitions for which they were eligible vote.

Dr. Poston recused on Sandia because he had a conflict there, but in any event, they voted affirmatively with the Board on all the other votes and the covers voting.

CHAIRMAN MELIUS: Okay. Thanks, Ted. Our next agenda item is the discussion of the Fernald SEC petition. So this was an agenda item at our last meeting to discuss today. I believe that all the Board Members and most of this information is available on the website, if you need information, background on, sort of, updating them on what's happened since the last Board meeting.

And there was a Work Group meeting, I believe, sometime in the last couple of weeks, where this was discussed and the Work Group, as I understand it, will have a recommendation for us.

I think this is how we're going to handle this is, I believe, John Stiver from SC&A is sort of going to give us an update, essentially, a carry on from his presentation at the last meeting. And then, after that, we'll follow up with a discussion.

And there will be a time for the petitioners to comment if they wish to. So

first, John Stiver.

MR. STIVER: Thank you, Dr. Melius. This is John Stiver from SC&A. And I was asked at the Work Group teleconference last week, actually one week ago from today, to provide the Board with a summary presentation of where we stand; what has transpired since the Oakland full Board meeting.

And so I put together a short slide show, which was distributed to the Board. It's entitled, Fernald Update Stiver-4-23-12. So I assume you all have that.

Unfortunately, there is a mistake I discovered on this one today, on Slide 5, which is the one that most of you who've been in Fernald have seen several times, but for the interest of clarity, it's kind of unfortunate that the values that I really wanted to present in that table are missing from the PDF that was sent out.

However, on the DCAS website, under the Board meetings for today, there's a list of documents that are available and if you look at

the last in that list, entitled, SC&A Draft Summary of SC&A Concerns Regarding the Latest Documents Posted by NIOSH to Complement Their White Papers on In-Vivo Thorium Bioassay, dated April 6th, there's a PDF there.

And on Page 19 of that, is the full table that is missing on Slide 5. So having said that, I'd like to go ahead and get started. Today is really more of a focused review on SEC Issue 6B, and this is the Use of Chest Counts to Reconstruct Thorium-232 Intakes for the Time Frame of 1968 to 1978.

And if you go along to Slide 2, this is kind of a review status of the issue to kind of bring everybody up to speed; where we are and what's transpired.

Now, basically, the description of the issue is that, beginning in 1968, Fernald went from doing breathing zone air sampling data and constructing these daily weighted exposures to controlled workplace conditions, to using this mobile in-vivo radiation monitoring

laboratory that was put together and built down at the Y-12 laboratory.

And then we sent out to the outlying labs, to Fernald, Paducah, Portsmouth, mainly the big uranium production facilities, because it was, basically, not feasible to bring all the workers in to Y-12 to have them counted in their fixed distance, they decided to go ahead and build a mobile system on a tractor trailer rig, and, basically, take it around to the various labs, and do their monitoring on site.

The point being is that, in 1968, when this system was installed, Fernald, basically, stopped doing their air sampling program for the purposes of health protection.

And so from 1968 on, till 1988, during this 20-year period, they were completely dependent on the integrity of the chest count data for being able to derive thorium-232 intakes during this 20-year period.

And there's kind of an elbow right in the midpoint between 1978 and 1979. 1968 to

1978, the results were reported in mass units, basically, in milligrams thorium, and there's no underlying, or raw, data available to support those values.

From 1979 to 1988, the results are reported in the activity values of the progeny radionuclides, lead-212 and actinium-228.

And from that, SC&A believes that the NIOSH approach for handling that set of data in that period is adequate for deriving a plausible upper bound value because the actual lead-212 measurements are available and can be manipulated in order to get back to a bounding value for thorium intake.

And that'll all become clear as we go through the subsequent slides. The status of the issue, lots of White Papers have been exchanged. For the last year, over three different Work Groups, there have been very intense discussions on this issue.

Three different Work Groups, April and August of last year, and then February 9th

of this year. At the full Board meeting in Oakland, I presented a summary of SC&A's position at that time and the knowledge we had.

We felt that from 1968 to 1978, the data that were reported in milligrams thorium were likely inadequate for the purposes of dose reconstruction and we felt this was an SEC issue. This was based mainly on two, kind of, interrelated issues.

The first being that we just didn't know what assumptions and what methods were used to derive those milligram. And we demonstrated that, depending on the method, which progeny was measured, there could be five orders of magnitude variability.

Basically, you could underestimate by up to a factor of a 100, and conversely, for the unexposed group, there could be overestimates by three orders of magnitude.

The other issue was this idea of a technical shortfall and maybe the system just was not adequate for its intended purpose under

EEOICPA, which is to be able to discern dosemetrically significant intakes.

And we talked about that. I presented our position on that. And it was last Wednesday, there was a meeting of the SEC Subcommittee. And during that time, this whole idea of sufficient accuracy is brought up in, kind of, a global context; basically, a program lag context.

And, evidently, DCAS is putting together a matrix of all SEC decisions and their bases, and then this whole idea of sufficient accuracy is really going to be addressed in a program-wide manner, which it really should be addressed in that form.

So this whole idea of a technical shortfall has, kind of, been deferred as it applies to this particular data set. I'm going to concentrate on the adequacy of the data set itself.

Moving on to Slide 3, February 24th, right before the Board meeting, NIOSH posted a

set of documents that was claimed to be relevant references that related to the estimation of thorium-232 intakes for Fernald workers using in-vivo data from the Y-12 mobile counter.

We reviewed that and discovered that, basically, there are NIOSH White Papers, several other supporting documents, which described different approaches that could have been used to calculate thorium-232 lung burdens during that time period of interest.

We delivered a response on April 6th. It was entitled, Summary of SC&A Concerns Regarding the Latest Documents Posted by NIOSH to Complement Their White Papers on In-vivo Thorium Bioassay. Kind of a mouthful and that's the one that I just referred you back to a minute ago.

In summary, what we did was, we went through each one of these documents. We did the technical evaluations, summary paragraphs, related to the SEC concerns. And we concluded that the NIOSH White Papers are all based on an

unsupported assumption.

And that is that the lead-212 was measured and thorium lung burdens in milligrams were calculated using those measurement results. As we left, that point still not clear, how the milligram thorium results were calculated, whether it was based on progeny activity, or a ratio method that had been put forth by Y-12, Hap West's paper in 1965, and some of the Scott papers in the '60s.

But at that point in time, we weren't really sure what particular method was used. And, of course, the related implications for the ability to reconstruct doses.

If we could move on here to Slide 4, this is, kind of, a preamble to the table, this Table 1, that has been seen many times by the Work Group. And we keep bringing it up because it's very important.

It is the only link at that elbow, basically, where the data went from being reported in milligrams to being reported in

progeny activity levels. And there's several results here that are of concern to SC&A because they illustrate inconsistencies between the milligram thorium data and the nanocuries of the lead-212 for this period of overlap.

And suggests to us that lead-212 probably was not used to drive the milligram thorium data, at least during the period we're concerned with.

If you take a look at Slide 5 here. Unfortunately, if you could take a look at the table on Page 19 of the document I referred you to, that would be best. If not, I can just talk you through it.

The table basically consists of five columns. The first column further on the left is reported thorium results in milligrams. The second column is the reported lead-212 activity in nanocuries. The third column is reported actinium-228 activity in nanocuries.

The fourth column is the monitoring date and the fifth column is the location or

plant member. And what we're really concerned with, there are two sets of data. All the data are from 1979.

The first consists of four values taken from June 2nd to June 19th of 1979 in a location, the Pilot Plant, or Plant 7, one or the other, and what's interesting here is that we have four values of lead-212, they're all above the detection limit of 0.23 nanocuries.

And because we have a snapshot in time at a particular plant, we're reasonably sure that this represents one particular source of thorium to which these workers would have been exposed. So you would expect proportionality between the lead-212 and actinium-228, and also between those daughter products and the reported results in thorium in milligrams.

You can see that there is a correspondence, proportionality if you will, between lead-212 and actinium-228, but the thorium results are all 2.1 milligrams right down the line. And this kind of concerns us.

And we have the second set of data that were taken in October from Plant 4, we see the same type of thing. There's five results there, all but one are greater than the detection limit. There's proportionality between actinium and the lead.

But there is the same, what turns out to be the detection limit, assuming equilibrium, of what would be derived for thorium; 2.1 milligrams across the board.

So this kind of led us to believe that maybe there's some concerns regarding how the data were being processed, whether the reasonable values were being produced from the detector, and also, the highest value, 5.1 milligrams, this was taken in June of 1980.

And this was during a time when the method of calculation for thorium was the progeny activity, and here we have a negative value of lead-212 corresponding to a 5 milligram thorium result.

And so, unfortunately, this is the

only set of data where we have an overlap and it's not, again, a very extensive set where you understand that, but it concerns us because it would seem to indicate that there may be some problems with this data set in terms of how those values were derived.

And move on to Slide 6, April 9th, NIOSH posted the PowerPoint presentation. This was the point of discussion at last week's meeting. It's entitled, Bounding Thorium-232 Intakes Using MIVRML Data, and Mark Rolfes also provided a nice Excel table that had hyperlinks to the various documents in the supporting references.

The one that really jumped off the page at me, we see most of them, but there was an interview conducted on March 15th of 2012, with 'identifying information redacted', who is the principle designer and developed of the mobile system.

And he's, evidently, a professor at the Louisiana State University and is quite

active. He was able to provide a lot of useful information that clarified some of our concerns, but yet also, crystallized some of our concerns regarding the validity of this data set as it's intended to be used in the program.

'identifying information redacted' indicated that the mobile system was patterned after the fixed Y-12 system and was calibrated and operated in exactly the same manner as the fixed system. They used the same calibration standard for both, which had a radium-228 equilibrium ratio of 60 percent and a thorium-228 equilibrium ratio of 80 percent, relative to thorium-232.

We did make an indication that those ratios would not be possible for a single purified thorium source, which indicates there may have been some radium contamination in that source material.

We used a REMAB phantom in the calibration, which was, basically, a plastic human effigy with a human skeleton and tissue

equivalent organ material inserted. I believe they used a sponge for the lungs to simulate lungs in the chest cavity.

And they put these little vials of the thorium calibration solution in the sponge. They filled the whole thing with water and then they did background counts. And the actual counts were workers for the 12,000 seconds, 20-minute counts, and they did use the empirical sum of ratios method that was described in the Scott and West papers in the mid-'60s.

NIOSH articulated their current position on Slide 8. They believe that the thorium mass reporting is not an SEC issue and that the intakes that are estimated from the mobile system are plausible, claimant favorable, and bounding.

So on to Slide 7, this really gets to the heart of the issue. Here we have the equation, empirical equation that was used for calculating the milligram thorium results. And you can see the milligram results are related to

a sum of the ratios.

There are three ratios consisting of counts in various regions of interest on a sodium iodide spectrum. And if you could just jump quickly to Slide 8, this is an example spectrum of what we're looking at here.

The top trace is for an exposed individual. The bottom trace is for an unexposed individual. And you can see that there's these bars. So there's a dark bar, and there's a light bar right next to it, and three different combinations.

The dark bar, the very first one, it covers the lead-212 photo peak centered at 240 keV. Next to it is an adjacent higher energy peak, which was used as a background for the ratio, basically, to the ratio of the 240 keV peak to the adjacent higher energy peak.

And then the same for actinium-228 at 330 and the actinium-228 in the 900 keV emissions. So if you go back to Slide 7 again, you can see that this was based on this Y-12

methodology and the rule of thumb document, which is a one-page letter from 1961, from 'identifying information redacted' to 'identifying information redacted'.

The ROI represents the total counts in a particular region of interest. For example, ROI 0.208-0.248 is the total count in the portion of the spectrum between 0.208 and 0.248 keV for the lead-212 emission. And the ROI 0.249-0.295 would be, then, the background count and the adjacent higher energy portion of the spectrum.

And so if we have three of those ratios, one for lead-212, one for actinium-228 at 330 keV, and one for actinium-228 at 900 keV, those are all summed, and they're compared to summed ratio with this value 3.23, and this is an average value of the summed ratios of the counts in the three ROIs that were obtained for about 1,100 non-exposed persons.

And so that, really, is the basis for a background distribution here; this 3.23. And

so then the difference between the summed ratios for the measured person in relation to the background and that differential, this then represents the elevation in those ratios in this empirical approach.

And the 8.84 is the coefficient that converts this dimensionless ratio difference back to units of mass in milligrams thorium. And it is specific to the calibration source and conditions of Y-12.

If we can move on now and leapfrog ahead here to Slide 9, April 17th, SC&A responded to NIOSH's presentation with a memo entitled, SC&A Comments on Slide 7 of the NIOSH Presentation, and that is posted. Hopefully, you were able to retrieve it before the meeting.

We had some concerns, mainly with this thorium coefficient. This is really this lynchpin that gets you back from this dimensionless ratio to a milligram value. It's an empirical value and it's specific to the sources, conditions, and calibration at Y-12 as

indicated in the Rule of Thumb document.

This other slide I have here as a sub-bullet, Health Physics Considerations Associated with Thorium Processing by Hap West in 1965, states that a rise in the ratio of 1 is equivalent to about 33 percent of the lung burden for the listed mixture.

And so we can presume that 8.84 milligrams, then, represents about 1/3 of a lung burden. And so given this particular situation, the way they were calibrated and the way they're counted, they knew the amount of mass thorium that was in the phantom, and they calibrate, then, back to an increase of a ratio difference of 1, so they basically increased from 3.23 to 6.46.

That ratio, then, corresponds to 8.84 milligrams given the conditions of calibration at Y-12. Now, the important from our standpoint is this, when you take this system out and you're going to take it off to Fernald, or even with the situation where you have, given

that you have thorium in all different stages; from the ore, which is in equilibrium, to nitrate, the freshly separated nitrate in the refinery, in which case there's, essentially, no equilibrium initially, and that will not, then, get reestablished, at least for about three weeks for the thorium-228 progeny, of which lead-212 is a member.

So we're concerned that you have this entire spectrum. We have that, the nitrate, all the way through oxide, metals production, then we have Type-S materials, you have an entire range of equilibrium, all the way from none, all the way up to a 100 percent equilibrium.

And so our concern, really, is, here you have a guy who may be working in the refinery and he may get a snoot full of this material. It may be a lot.

And the unlikely, but yet, plausible scenario is that that guy could get counted a few days later, and he's got a big intake, and yet,

it's not going to be detected using this system. So that's one issue.

The MDA issue is another one of concern. For a long time, we weren't really sure how this 6 milligram stated detection limit was derived, and now we know it's based on this background distribution, this 3.23, of the summed ratios for the unexposed personnel.

The 95th percentile confidence interval on that value ranged, basically, 2.23 minus 0.7 to 2.23 plus 0.7. And so taking that 0.7 differential and multiplying it by 8.84 gives you 6. And so the background distribution, which encompassed about 97 percent of all the results in this data set, were less than 6 milligrams.

Basically, anything from minus 6 to plus 6 with a mean of about 0. So the stated MDA is not based on the counting statistics of the MIV system, it's based on this empirical value derived from a group of unexposed individuals.

Moving on to Slide 10, to try to get

a handle on what type of disequilibrium conditions might have existed and what the results could mean using (phone connection lost) approach. We did some hypothetical calculations.

This particular example, we assumed that the worker was exposed to Type-M thorium for 60 days and then monitored on the mobile system, and we assume that he was monitored in the era that he was working with thorium, on one of six dates, either in the middle of his exposure period, which would have been 30 days after the first day of exposure, on the last day of exposure, 90, 120, 180, and 360 days after the first day of exposure.

For the sake of illustration, we're assuming that the stated detection limits in nanocuries that are provided post-1978, we used those to determine detectability for this particular example.

We assume that 10 milligrams were measured. The daily intake spans over an order

of magnitude depending on which of those dates the individual was measured. This is nothing new. I think we presented this on our previous two Work Group meetings.

We looked at three different situation. One would be the source in equilibrium. One would be this triple-purified thorium, which is what NIOSH uses as a, kind of, favorable assumption for the period during which lead-212 measurements are available.

This, basically, results in a disequilibrium of the ratio of thorium-232 to 238 of 1 to 0.19, basically, a 5.25 factored off. And also, we looked at the single purification. This is a situation where you might have a single purification followed by an intake.

And, you know, you're not going to have actinium building in because it's building in at the 5.75 year half-life of radium-228, but you would see a thorium-228 peak within about three weeks.

We looked at these three different

options. And for the first, when you got a source in equilibrium, a 10 milligram measurement, you're going to wind up with about 1.1 nanocuries on all dates, because you're basically in equilibrium.

So this have a situation where the ratios in all three peaks, the ROIs, would be detectably different from background. Then we looked at the triple-purified scenario. And in that situation, the intake would have been completely missed, even out to one full year after the intake had begun.

And then on the single purification, we have a situation like I described where you have a detectable peak in the lead-212 photo peak, but nothing detectable in the actinium photo peaks.

So you end up with a situation where you've got only one photo peak that is comprising the sum of the ratios there. And when you look at that equation, and you go back to it, and you rearrange it, however you might try, you find out

you can't there from here, in simple terms.

There's just no hook back to that lead-212 activity because, even in the simplest case where you have just the first ratio, you have R1, I'm going to call it, for brevity, and you have a milligram value.

Now, you could rearrange that equation and you could say, okay, well, here, we can isolate our 1 and we can model what the background count would be, so we could have a measure of B in that power of Y of interest.

Well, the problem is, you've got that 8.84. And that is only applicable to the calibration conditions at Y-12. So even in the simplest case, you have one equation with two unknowns.

Now, let me move ahead to Slide 11 here. This is kind of a summary of where we stood after reviewing the NIOSH presentation going into the meeting last week. And there were three main issues of concern to us.

Well, actually, there's more than

that, but the sum of ratios could, potentially, miss very large intakes as we indicated, depending on the number of purification and the age of the source since separation.

The coefficient of 8.84, we believe to be narrowly defined for a set of conditions that were unique to Y-12 and that aren't really transferable to Fernald, or any other facility for that matter.

The thorium was present at Fernald in both soluble Type-M, the thorium nitrate tetrahydrate, the TNT, and also as an insoluble Type-N, is the metal and the oxide.

And so the concern we have here is that radium -- this whole issue of physico-chemical translocation. This would be important for small particles down in the respiratory fraction for the radium that's produced in the Type-S matrix could actually escape the matrix and then behaves more as a Type-M material and be translocated out of the lung.

And we've discussed this at length in the Work Group discussions. I'd also like to point out, there's a lack of coherence in the NIOSH presentation between Slide 6 and the Slide 7, and this gets back to the idea that the NIOSH White Papers which provide a methodology based on this triple-distilled thorium as being a claimant favorable worst case.

They're all predicated on having lead-212 measurements. And so this factor of 5.25 based on the disequilibrium of 0.19 of thorium-228, it's derived assuming that lead-212 was measured and that the lead-212 result was used to derive the milligram of thorium results.

That same correction factor is not applicable to the empirical method as described on the Slide 7. And I might add at this point, Mark Rolfes posted a one-page sample problem about an hour ago that implies, once again, that you can take this 5.25, this range of disequilibrium, if you will, without even having

a lead-212 measurement, and apply that to a milligram result to get a worst-case situation.

And we don't believe that that is really an acceptable way to go. I know Mark is probably going to want to talk about this, so I don't want to get into right now in too much detail, but we believe that that ratio could be anywhere from 0 to a 100 percent.

And given the fact that you have a milligram value based on a ratio and you've got that conversion factor that's applicable to one particular situation, we don't see that you can take a milligram value and, a priori, assume that it's based on the Y-12 measurement.

So in summary, we feel that if that empirical equation in Slide 7 was applied without modification, and which we believe it was. I mean, the principle architect of the system indicates that that's what happened so we have to believe that that's the way it was done.

And so we believe the milligram thorium results were not derived correctly and they carry huge uncertainties. And don't believe those uncertainties can be reconciled. And we also believe that the thorium lung burdens that are reported in units of milligrams, '68 to '78, cannot be reconstructed and associated with the meaningful intakes.

I'm just reading this right of the page here. And so we believe that it does appear possible to place a scientifically sound and plausible upper bound on the thorium body burdens for some workers, which is what we would have to do to really have a one-size-fits-all model.

And this gets us to April 19th, and finally, this is where we come into the Work Group discussion. NIOSH presented their position and we responded, as stated in this presentation that I've given today.

The Work Group discussion focused, mainly, on, not surprisingly, the Rule of Thumb

sum of ratios method. We kicked around a lot of ideas during the discussion. We came to some conclusions. This is my interpretation of it and DCAS may have their own take on this, but these are what I felt were the salient points.

We have only milligram values reported. The counts and the ratios are not reported or available, to the best of our knowledge. The coefficient for converting the sum of ratios to milligrams is specific to a very narrow set of conditions and can't be applied to sources at Fernald.

There are many unknowns in the empirical equation, but only one value given, which is a milligram value, and so we just don't see a way to get back to lead-212 activity, which would then allow us to go ahead and place a plausible upper bound on the value.

As we indicated, lung burdens in the 10's of milligrams could have been missed altogether. Also, our Table 1 shows that, given values measured at a progeny greater than the MDA

are not proportional to the stated milligram values.

And we also have noted in previous discussions that, the situations where there's high values, you know, 10's of milligrams, can be followed by very low values, which really don't comport with known biokinetic properties for the solubility types of concern.

And we also noted that several very high values showed no follow-up measurements whatsoever. So that kind of called a lot of this in question as well.

And really, I guess, the thing to take home at the end of the discussion was this last bullet, given the current state of knowledge regarding the methods employed, and the lack of available raw data in terms of the ROI counts, efficiencies, and the source characteristics.

My understanding is that the Work Group's position was that, we don't believe that a plausible upper bound applied to the milligram

data for the period of '68 to '78.

And that's it in a nutshell.

CHAIRMAN MELIUS: Okay. Thank you, John. Do Board Members have questions for John?

MEMBER MUNN: This is Wanda. I have one. I think it's a valid question. It's very difficult to tell, but there is one thing I'd like to ask.

John, since most of the people who are trying to grasp what you folks like to call the granularity of the issues here, don't do this on a regular basis, it's very difficult to follow the line of thinking because it jumps around from one facet of the calculation to another.

Is it fair to further simplify your summary by saying that the contractor believes that because it can be postulated there's a circumstance where the algorithm that was used isn't accurate, then consequently, no bounding method is adequate. Is that a valid summary?

MR. STIVER: I would say that, given

what we know and this methodology that was implied, I don't see that there is a way to get back to a plausible upper bound value.

This could range anywhere from total disequilibrium all the way up to full equilibrium. And we just don't know. We don't have that handle, that hook, that would allow us to even have any faith in what the milligram value that was reported it, much less, take that and these varying ratios to try to get back to what a lead-212 measurement could have been.

So what you're stuck with is basically, you just throw out the data and just model it, and assume that, well, it could range anywhere from, you know, nothing to a 100 percent, and so here we have some value and we'll say what's the worst case it could possibly be?

You know, in my mind, that would be a pretty shaky foundation to base, you know, potentially, 100s of compensation decisions on.

MEMBER MUNN: It's difficult for someone who doesn't do this all the time to see

how you cannot place an upper bound, given the fact that we have data, and the data is fairly extensive.

It seems that by being -- I thought I understood the real argument here as being one of sufficient accuracy rather than inability to bound, but it's kind of worked around to an inability to bound. Am I still understanding what has transpired in the last, say, month?

MR. STIVER: Yes. At the beginning of the presentation I had indicated that we're not going to talk sufficient accuracy, really, in terms of, kind of, this global overarching issue of whether the system was adequate for its intended purpose. I think, maybe, that's what you're talking about from the Oakland meeting.

MEMBER MUNN: Yes. That's what our purpose has been prior to this.

MR. STIVER: Yes. We're really talking about an ability to bound. Now, for the later period where the data reported in the nanocuries of lead-212 and nanocuries of

actinium-228, we feel that NIOSH's approach that were put in Tom LaBone's RIF paper using this triple-distillation approach for claimant favorability.

We feel that that's reasonable and that could provide an upper bound, because you have that hook. You have the lead-212 measurement. We know how far out of equilibrium it could have been. And so we can place a plausible upper bound on that.

For this data set, the way it was derived based on this empirical formula, I just don't see a way out; to be honest with you.

MEMBER MUNN: Thank you, John.

DR. LIPSZTEIN: Can I try to help, John?

MR. STIVER: Certainly.

DR. LIPSZTEIN: This is Joyce. Can I try to help?

MR. STIVER: Sure. Please step in.

DR. LIPSZTEIN: Once you have the worst-case scenario that NIOSH has posed to us,

that was a triple-separation of thorium, purification of thorium, that you end up with a ratio of thorium-232 to thorium 228 of 0.19.

And I made a calculation that if someone had a 10 milligrams lung burden of thorium-232 and he was measured at the lung counter, and the way it was calculated by those three terms on the equation that are summed, all three equations would be below detection limit.

So we won't see any peaks there. Everything would be the same as background. So you would have 10 milligrams in your lung, but you could see anything on the 95 percentile between minus 6 milligrams and 6 milligrams, that would be your reported result.

So in answering this, first, you know, there is a large uncertainty. You cannot bound something that is between minus 6 to 6 to 10. What's the bounding? I don't know.

And second, I think it was wrongly applied at Fernald at the time because that equation is only valid for the Y-12 sources where

you can see both peaks, the actinium and the lead peak. When you cannot see one of the peaks, then that equation cannot be applied.

So you have values in milligrams that doesn't mean anything.

MR. ROLFES: Joyce, this is Mark Rolfes, and we agree that there may be values less than the limit of detection. And NIOSH would apply the missed intakes based upon 2 of the limit of detection of the count. That number would be adjusted by our claimant favorable correction factor of 5.25 for triple-separated thorium.

And we feel that we can place an upper bound on the worst-case scenario amount of thorium that was deposited in someone's lungs.

DR. LIPSZTEIN: May I respond?

MEMBER MUNN: That's what I wanted to hear, Mark, because the negative uncertainty is confusing to people who don't deal in uncertainties all the time. Your explanation helps. And thank you, Joyce.

I read, very carefully, the material that you provided on the 17th, you and John responded to the algorithm, and tried to make sense of that, not being a person who does these kinds of calculations normally, and recognized when I got to the point where you were reporting a lower daily intake for a 60-day exposure to the 2 milligrams and was reported for the 30-day milligram.

I realized that I was missing a couple of the basic factors related to ingrowth and I stopped trying to figure it out. So that's why I'm asking these questions.

DR. LIPSZTEIN: It's a very good question. It's really very confusing, but --

MEMBER MUNN: Well, I recognized what the basis was, Joyce, and recognized that I was not competent to complete that calculation, and so I didn't even try, but thank you both for helping to explain at least a part of the rationalization that we're going through here. Thanks. I think I'm okay.

DR. LIPSZTEIN: Okay. Thank you.

MEMBER MUNN: Thank you.

MEMBER ZIEMER: Dr. Melius, this is Ziemer.

CHAIRMAN MELIUS: Yes, Paul?

MEMBER ZIEMER: A couple comments. And I was on the Work Group so let me add to this discussion. A couple points that should be made on the final bullet that said the Work Group does not believe a plausible upper bound can be applied.

I think we should point out that, at the Work Group meeting, there were only two of the four Work Group Members participating; Brad, Clawson, and me.

And at the time of that meeting, and I told the group, with what information we had at the end of the meeting, I agreed that we could not do a plausible upper bound and it really focuses on that equation and how it's used.

But even at that, there were just two of us representing the Work Group, so I'm not

sure it's fair to say that that's a Work Group position since there were only two of the four there, but that's, sort of, just a point on John's comment.

I think, John, it certainly looked like we were making that as a recommendation, but did not have, in a sense, the majority. But let me follow that up with the other point I was trying to make at the meeting.

And that was, it seemed to me that, in principle, and following up on Joyce's comments, which, obviously, are very pertinent to this, that, intuitively, it would seem that there would be some value for the freshly separated material, some value, above which, you could detect it, even though there would be virtually nothing in the upper regions, you would find a lower region peak.

And from that, one, perhaps, could do bounding. The only other question then would be on that 8.84 value and that still remains a problem for us.

It seemed to me that there must have been some reason, because 'identifying information redacted' had been brought aboard, and I guess was actually Fernald when this was first used and calibrated, for which he felt that that value, which was established at Y-12, could also be used at Fernald.

But we have no information on that at this point, so that remains a problem.

MR. STIVER: Dr. Ziemer, this is John Stiver. You know, the documents at the time indicate that they were fully aware of the drawbacks to the approach, but it was basically used as a screening approach.

MEMBER ZIEMER: Right.

MR. STIVER: Even later into the 1997 to 2001 time frame, the Mound Technical Basis Document for Internal Dosimetry, indicates that that methodology, even with their own fixed system, which they had at the time, was, really, only to be used for screening-type calculations.

And so I think that you got keep it and, you know, kind of give the historic here is that the system was really put into place to measure fractions of maximum permissible body burdens for uranium-235.

Now, you look at all the quantitative calculations that were done that are available, every single one is for uranium and there's none for thorium. And so they're taking a substandard system out there, something that wasn't fully vetted, I think they understood the limitations of the system and for which it was being applied at the time.

CHAIRMAN MELIUS: Any other Board Members have questions? If not, I'd like to first hear if NIOSH has any comments at this point. So, Stu.

MR. HINNEFELD: Dr. Melius, this is Stu Hinnefeld. Did you speak my name or did you say any --

CHAIRMAN MELIUS: No. Stu Hinnefeld, I'm asking if NIOSH has any comments

at this point.

MR. HINNEFELD: Well, Mark did submit a one-page item this morning that describes the possible ranges of lead-212 that could be associated with a particular amount of thorium. All the way from full equilibrium down to this triple material that would be a fraction of the lead-212. It would be only about 19 percent of equilibrium.

And then provides, as a bounding interpretation of the in-vivo reading, it was a bounding interpretation of what a 20 milligram (phone connection lost). Let's make a bounding interpretation that that could be a full equilibrium number and it would be 0.19 nanocuries of lead-212.

But then to do dose assessments, we're going to recognize that we could very well not be in equilibrium. It could be triple-separated and then multiply that times, roughly, 5, you know, to get your answer; that would be what we consider the value.

So the question then becomes, is that interpretation of bounding interpretation? What I mean is, is, you know, interpreting a milligram mobile counter result as, I think it's, 0.22 nanocuries, is that, in fact, bounding?

Now, it would seem to us that the 0.22 nanocuries should be higher than what the amount of lead-212 that was there, in reality, based on the calibration of the counter, because the calibration of the counter have a full equilibrium source.

And so 20 milligrams should, in fact, relate to some smaller amount, like, what, 80 percent or something, of 0.22, if the material in the person's chest was the same as the material in the calibration source.

So it seems like, maybe, that is an overestimate, and maybe that is a bounding interpretation, but then you have to consider, well, what do we know about how the counter behaves when we have both actinium measurements

and thorium mass measurements?

And I keep going back to this table in the SC&A presentation about the 1979 data where you have both. And several of these 1 milligram results have lead-212 activity values that are higher than what the equilibrium value would be.

You know, if it was 2.1 milligrams, the equilibrium value would be, what, about 0.23, or something, nanocuries and you have upwards to 0.4 nanocuries of lead-212 associated with the 2.1.

MEMBER KOTELCHUCK: This is Dave Kotelchuck. I just got cutoff a moment ago and I'm reentering the conversation. So please go ahead; just for the record.

MR. HINNEFELD: Okay.

MEMBER KOTELCHUCK: Go ahead.

MR. HINNEFELD: And so I'm looking now, 2.1 milligrams is below the detection level of the in-vivo counter, so a 2.1 milligram, theoretically, wouldn't be treated as 2.1,

although I'm not a 100 percent sure that's true, based on how the coworker model is built.

But if we did say that, since it's below the detection level, we're going to do this based on half the intake. We would say that's 3 milligrams, so our bounding interpretation would be 0.3.

And there are, looks like, three of these values where the lead-212 activity is 0.4, that's associated with a 0.21, so it's not fair, even in that case, that by using the LOD over 2 interpretation of a count that the equilibrium consideration actually provides you a bounding estimate of the lead-212.

I'm not a 100 percent sure and the fact that the milligram of thorium is below, pretty much we agree, what can be detected. I don't know if that factors into the validity of that argument or not, but it worries me that I'm not sure how confident we are that the interpretation of a 20-milligram readout as 0.22 nanocuries of lead-212 is bounding.

I'm not so sure that the counter works, that we understand, well enough, how the mobile counter works and how those numbers come popping out, to really make that conclusion that, assuming equilibrium is, in fact, the bounding interpretation of that number.

So that was a lot to say to answer the question and say, gee, I'm not so sure.

MEMBER MUNN: And it was hard to follow too.

MR. HINNEFELD: With respect to other information that might be relevant, my staff has informed that there is a computer code, it's a Monte Carlo code, that can model counting arrangements, and specifically, in-vivo counting arrangements, and specify your sodium iodide detector, and your subject, you could then model various combinations of lead-212 and actinium-228 in the lungs, Monte Carlo the efficiencies of the detectors for those various radionuclides, so that same program will also Monte Carlo the Compton continuum that you get

from the K-40, which is the main contributor of the Compton continuum in a sodium iodide in-vivo spectrum.

And presumably, since these were in the '60s and '70s, you'd want to put in some cesium-137 as well because that one can also contribute to a Compton continuum.

And then, theoretically, you could generate these spectra and actually generate what the vector should be, you know, seeing what the ratios should actually be for various combinations of radionuclides.

Now, there will not be any way to validate that code since we don't have a mobile in-vivo counter to compare the code results to. And my own view is it seems like a long way to go, but with a lot of assumptions built in.

And the obvious drawback, that that code is not capable of determining the effects of the intrinsic background, or the empty chamber background, and how that might effect ratio counting.

So in my way of thinking, that's a long way to go and probably not get a significant payoff at the end, but I've not asked anybody to pursue that, but it is something that is available.

So I've just provided a lot of words, probably not very coherently, because I've been thinking about this all morning, and I'm still troubled by whether we really understand, well enough, how those ratios, that the mobile depends upon, are affected and how various amounts of the various activities, you know, how do you interpret that, even in a bounding fashion?

So I'm really having trouble convincing myself that we can make a bounding interpretation given the unknowns about how those ratios behave in different combinations. Sorry, but that was a long way to go and not very far.

CHAIRMAN MELIUS: No. Thank you for that. That's helpful. The Work Group,

Brad, do you have any comments? I want to hear from the petitioners.

MEMBER CLAWSON: You know, I just wanted to say, you know, we've been dealing with this for an awfully long time and Paul was right, there was only me and Paul, but as we came away from that meeting, we really did not see a way of being able to address this properly, especially being a compensation act.

We could continue on doing all these, but we're still going to come up with an uncertainty that we're not ever going to be able to prove, you know? I just think that we're at the point for this as an SEC, and that this is why we brought it before the Board at this, and this is what the recommendations of just me and Paul were that we bring before the Board, and that was our feelings.

CHAIRMAN MELIUS: Okay. Thanks, Brad. Are the petitioners on the line and do they wish to speak?

MS. BALDRIDGE: This is Sandra.

CHAIRMAN MELIUS: Hi, Sandra. Go ahead.

MS. BALDRIDGE: I'd like to read a statement that won't be quite as spontaneous as the frustration I voiced at the last meeting.

Over the past five and a half years, I've listened to countless hours of technical discussions about the complexities of uranium and thorium, whether their levels are bounding or not.

But the quality of worker records and the data integrity has always been the SEC issue under which this petition was presented. Numerous FMPC historic documents express a lack of concern for accuracy in worker records.

For reasonable accuracy, the workers in dose reconstruction, must be identified based on the job or task assigned, the location, the substance, and the length of exposure. FMPC records fail to accurately document the work history of the worker on the their roadmap for dose reconstruction. Some

simple comparisons were overlooked.

According to the rules and regulations 42 CFR 82.2, the basic principle for dose reconstruction is to characterize the radiation environment to which workers were exposed and then place each worker in time and space within this exposure environment.

Then methods are applied to translate exposure to radiation in to qualified radiation dose at the specific organ or tissues relevant to the type of cancer. Many workers were assigned hypothetical intake values because this criteria could not be met.

They failed to characterize the radiation environment, as evidenced by the missing of the thorium in Plant 6 from 1960 to 1964, the disallowing of the air stack monitoring data due to falsification of those readings.

Each worker cannot be placed in time and space within the exposure environment. Documents in the petition from the management

state that the employment records were incomplete because they only show plant assignments, but not actual work location or jobs performed at any given time or period of time.

Employment records showed the plant they were hired to work in, but in the early-1950s, the facility was still under construction and workers were sent to the Pilot Plant.

Because the employment records didn't reveal this temporary assignment, which was up to a year in some cases, this exposure was not factored into the dose reconstruction, but rather, a dose was assigned according to the employment records for the plant that was still under construction.

Many workers received kidney damage due to exposure to uranium hexafluoride while working in the Pilot Plant. To my knowledge, workers whose records showed they worked in the Pilot Plant have received compensation, while

those who worked there temporarily, and incurred the kidney damage during that time, have not been.

Workers who were dosed with OTIB-2 under the worst-case scenario were not dosed for uranium hexafluoride. This is just an example of how exposures were missed.

I've spoken with numerous workers who have complained about being dosed for the wrong work locations and work assignments. Attempts to correct these errors have been unsuccessful. Workers' account of the workplace, in some cases, have ben ignored in favor of errors in the FMPC documents.

Under CFR 82.27, NIOSH is authorized to review completed dose reconstructions in its own initiative upon obtaining new information. By failing to adjust for thorium in Plant 6 for the years from 1960 to 1964, they have chosen to make it an SEC issue.

I am hoping that the Plant 6, 1960 to 1964, thorium exposures would be included in

the items that are being considered today, although that may not be the case and I'm hoping that today's result will be good for some, although the journey will continue for others.

Thank you very much.

CHAIRMAN MELIUS: Thank you, Sandra. Is there another petitioner that wants to speak? I can't quite recall. Is there more than one petitioner on this one? Okay. If not, then we'll go ahead. I think for consideration, and I'll let -- I'm not sure we have a formal recommendation from the Work Group.

I think my understanding would be that we have at least some level of agreement between Paul and Brad on moving forward, but I think, given that there were just two Members at the least meeting, I think we'd look for a formal motion at this time if we want to move ahead with this SEC.

MEMBER CLAWSON: Yes, Paul. This is Brad. I'd like to make a motion that we give Fernald an SEC from January 1st, 1968 to December

31st, 1978.

MEMBER LEMEN: This is Dick Lemen. I second that.

CHAIRMAN MELIUS: Okay. So we have a motion from Brad and a second from Dr. Lemen. Further discussion?

MEMBER GRIFFON: Jim, this is Mark Griffon. I'm assuming that the motion is intended to be for all workers? Is that part of the amendment?

MEMBER CLAWSON: I'm sorry. Yes. It was all workers. I'm sorry. I had that written up and sent off, but I was reviewing the dates of when we got to, and it should be all workers from January 1st, 1968 to December 31st, 1978. Thank you, Mark.

CHAIRMAN MELIUS: Somebody said something, I couldn't understand it. Do we have further discussion? Any Board Members?

MEMBER KOTELCHUCK: This is Dave Kotelchuck. I'm new to the Board. This is the first Board meeting I've attended. I cannot

evaluate the discussion that's been going on for the last six years.

So I feel that I must abstain, or I wish to abstain, on this vote.

CHAIRMAN MELIUS: That's fine. And just for the benefit of the new Board Members, if you haven't been at our meetings, how we do this is, we do a roll call for all --

MEMBER KOTELCHUCK: Oh, okay.

CHAIRMAN MELIUS: So at that point, you can decide how to handle it.

MEMBER KOTELCHUCK: That's fine.

CHAIRMAN MELIUS: Thank you, Dave. Other Board Members with comments or questions at this point?

MEMBER MUNN: Jim, this is Wanda. I don't know whether it's my phone or whether it's yours, but your (phone connection lost)

MR. KATZ: Wanda, are you still on?

MEMBER MUNN: Yes, I am. Can you hear me?

MR. KATZ: Now we can. You cut out.

Whatever you were trying to say did not come across.

MEMBER MUNN: Well, what I was trying to say was, Dr. Melius' phone, something about his transmission is fading in and out on my line. I don't know whether it is on other people's or not, but whether it's mine. I'm losing some of what he's trying to say.

My other question was, I wanted to, before we took vote, clarify what I think I heard Stu Hinnefeld say. So did I understand you to say that there is now some question in your mind as to whether or not we can, in fact, place an upper bound of thorium intake during this specific period.

MR. HINNEFELD: During this period?

MEMBER MUNN: Yes.

MR. HINNEFELD: Yes, there is. It's not a 100 percent clear to me that we know, well enough, how the in-vivo monitor works. By that I mean, how was that sum of ratios affected by the possible combinations of daughter

products that could be there.

And that's the only thing that matters in terms of what the in-vivo counter spits out is, how is that sum of ratios affected? And so I don't know that we know, well enough, how that sum of ratios is affected in order to be confident on how to interpret a milligram number that's spit out by the in-vivo mobile counter.

And a part of that reason comes from not being able to reconcile some of those counts where we have thorium milligrams and actinium measurements both for the same count.

MEMBER MUNN: Now, does it follow, then, that if we -- for this particular segment of information during this particular time, that we do not know enough about the source terms in the plant to be able to make a reasonable bound? Are we relying solely on --

MR. HINNEFELD: Well, our knowledge of the source terms in the plant, I don't know is entirely relevant. It's certainly a factor.

We don't know source term in a particular subject's lung, so that is a key part of this.

MEMBER ROESSLER: This is Gen. Jim, may I ask a question or make a comment I guess?

MR. HINNEFELD: We really don't let Jim on these things.

MEMBER MUNN: Pardon?

MR. HINNEFELD: This is Stu or you want to ask Dr. Melius?

MEMBER MUNN: I was just asking if a Board Member could make a comment at this point.

CHAIRMAN MELIUS: Yes. This is the time for the Board Members to comment or ask questions.

MEMBER ROESSLER: Yes. It's difficult to hear, but what I've gathered through all of this discussion that there is a question, yet, in NIOSH's mind as to whether bounding can be done on the thorium exposures.

I'm left really frustrated because

it would seem at this point that what one would do is answer some of the questions that have come and to do some further investigation on this, and yet, we're faced with a vote.

So I'm left not really knowing which direction to go. If we take a vote at this point, I think I'm going to have to abstain because I really haven't gotten any conclusive answer from anyone. It seems everything is, there's still a question as to whether it can be done.

It appears that NIOSH has an approach, and yet, within NIOSH, there's disagreement as to whether it can work.

CHAIRMAN MELIUS: Any other Board Member comment?

MEMBER SCHOFIELD: Jim, this is Phil.

CHAIRMAN MELIUS: Yes, Phil.

MEMBER SCHOFIELD: I'd just like to make a comment that at that some point, we've got to call this and make a vote on this issue. And

there's just so many uncertainties that I don't feel confident that they can bound the doses. That's all I have to say.

CHAIRMAN MELIUS: Okay. Thank you, Phil. Any other Board Members with questions or comments? This is Jim speaking, but I would just, you know, in response to Gen's comment. I mean, it's been over six years now. I think our guidelines for reviewing SECs, it's saying, we're looking for a demonstration that those reconstructions can be done.

You know, a plausible upper bound inaccuracy, we've not really heard that, or seen that, demonstrated. And how I interpreted what Stu was saying is that, while there may be other issues to explore, it is, you know, very skeptical that those will lead to a reasonable method that would satisfy what needs to be done in order to do those reconstructions.

So I think we've gone through this for quite a long time and spent a lot of time, and really just don't have a dose reconstruction

method that we have confidence in. And therefore, I would, you know, support the motion based on that time period.

Any other comments from Board Members; or questions? If not, I'll ask that Ted take a roll call. Ted, are you there?

MEMBER ANDERSON: Who are you looking for?

MR. KATZ: I'm sorry. This is Ted. I was on mute. Sorry. So, yes, I'm going to do this alphabetically. I'm going to run through the list and --

MEMBER ANDERSON: What's the motion again?

MR. KATZ: The motion to add a Class.

MEMBER ANDERSON: Okay. That's all. I just wanted to know.

MR. KATZ: Okay.

MEMBER ANDERSON: I got it.

MR. KATZ: Everybody clear? Okay. So any way, let me start the vote and I'll include

people that may be absent or may not. Dr. Anderson.

MEMBER ANDERSON: Yes.

MR. KATZ: Ms. Beach.

MEMBER BEACH: Yes.

MR. KATZ: Mr. Clawson.

MEMBER CLAWSON: Yes.

MR. KATZ: Dr. Field.

MEMBER FIELD: Yes.

MR. KATZ: Mr. Gibson are you on the line? Okay I will have to collect his vote after this. Mr. Griffon.

MEMBER GRIFFON: Yes.

MR. KATZ: Dr. Kotelchuck.

MEMBER KOTELCHUCK: Abstain.

MR. KATZ: Dr. Lemen.

MEMBER LEMEN: Yes.

MR. KATZ: Dr. Lockey is recused. Dr. Melius.

CHAIRMAN MELIUS: Yes.

MR. KATZ: Ms. Munn.

MEMBER MUNN: Abstain.

MR. KATZ: Dr. Poston are you on the line? I will have to collect his vote. Dr. Richardson I will have to collect his vote. Dr. Roessler.

MEMBER ROESSLER: Abstain.

MR. KATZ: Mr. Schofield.

MEMBER SCHOFIELD: Yes.

MR. KATZ: Ms. Valerio.

MEMBER VALERIO: Yes.

MR. KATZ: And Dr. Ziemer.

MEMBER ZIEMER: Yes.

MR. KATZ: Okay. There are ten yeas, so the motion passes. Three abstentions and we have three absent Members, I'll collect their votes.

CHAIRMAN MELIUS: Okay. Thank you, Ted. And thanks Members of the Board and thank John Stiver, Stu Hinnefeld, Mark Rolfes, everybody involved in this. And Brad and the Work Group for all your efforts on this. There's still more work to do, so we'll be talking about this some more.

The next item on our agenda is an update on Special Exposure Cohort Petition Status. LaVon?

MR. RUTHERFORD: All right. Thank you, Dr. Melius. At the Santa Fe Board meeting, we plan to present six evaluations; Titanium Alloys Manufacturing, Oak Ridge National Labs, Winchester Engineering, Hanford, and hopefully, Clarksville and Medina.

Clarksville-Medina, we actually uncovered some documents that we want to look at before we actually make our final determination, so those last two are, kind of, in question right now.

TAM, Titanium Alloys, the Board already has. Oak Ridge National Lab, the evaluation should be with the Board approximately three weeks prior to the Board meeting. Winchester Engineering, we actually should have that evaluation to the Board later this week or some time next week.

Hanford, it's another 83.14. We've

been working on that for some time. We anticipate that being out in the next three to four weeks.

And again, Clarksville-Medina, we're working those. Those are both 83.14s. We had taken the position that those reconstructions are not feasible, however, we did uncover some documents. We want to go look at those documents.

We anticipate having them fairly soon and our goal is to have both of those -- if the documents do not change our determination, our goal is to have Clarksville and Medina presented at that meeting June as well.

So again, there's six Evaluation Reports; two 83.13s and the other four are 83.14s where we have determined dose reconstruction is not feasible. And that's about it.

CHAIRMAN MELIUS: Anybody with questions for LaVon?

MEMBER CLAWSON: LaVon, this is Brad Clawson. What documentation and where's

it at?

MR. RUTHERFORD: Well, the documents were identified at Sandia, I believe it was Sandia, and again, you know, until we look at the documents, I can't make a statement on whether we think it's going to change our opinion.

These documents were identified as being potential documents that may have exposure monitoring information.

MEMBER CLAWSON: I understand. I was just involved with Sandia down there. I was just wondering where the documents were at because this probably isn't something new then.

MR. RUTHERFORD: It's documents that we have not actually seen previously.

MEMBER CLAWSON: Okay.

CHAIRMAN MELIUS: Any other questions for LaVon? What I think that that means for Board Members is that, Ted and I have been communicating on this and he may have some additional comments, but it looks like our Board

meeting in Santa Fe will be a long two and a half days.

So it depends on the, yes -- it's always hard to judge those ahead of time, but we've got a number of Work Groups that will be bringing, maybe bringing, recommendations to the Board. And then we have, obviously, the new ones that are updates for old ones that NIOSH have gotten out or will be getting out.

So I think we can plan on staying in Santa Fe at least through noon or 1 o'clock on Thursday I believe. I think we're scheduled Tuesday, Wednesday, and the half a day Thursday. Ted, do you have anything to add to that?

MR. KATZ: This is Ted. Can you hear me? I think that's right. I don't think there's any way we're going to be pack today in the two days unless a lot of things fall off the table at the last moment.

I do have a question for LaVon, which is one of the items that's a little bit uncertain. It's the GDP Work Group, to use

shorthand for that Work Group, Uranium Refining Work Group, AWE Work Group, was hoping to close out K-25, that profile review.

There are a couple items left to get done and I corresponded with LaVon a little bit about where things stand, but I'm unclear as to whether you think that'll be ready in time for the June meeting.

In other words, would that Work Group meeting book in advance and do it or not? So, LaVon, can you just help me with that one?

MR. RUTHERFORD: Actually, Ted, are you sure you corresponded with me on that one? I'm wondering if you corresponded with Chuck Nelson.

MR. KATZ: No. I did with you, actually. I don't want to get in any details here and now.

MR. RUTHERFORD: Sure.

MR. KATZ: But there are a couple action items left on DCAS' plate to close this out.

MR. RUTHERFORD: Okay.

MR. KATZ: One is a classified interview and the other has to do with -- well, anyway, I don't want to get into the details.

MR. RUTHERFORD: Yes. You know, I'll get an answer quickly on that and I'll get a response out to the Board as quickly as possible.

MR. KATZ: Okay. Thanks.

CHAIRMAN MELIUS: And, Ted, this is Jim. I would just add to that that we may, since it's Site Profile closeout. We may just want to do that as they hold through the next Board call or the following Board meetings.

MR. KATZ: Okay.

CHAIRMAN MELIUS: I think there's less urgency to that, but I'm not familiar with what they might be recommending, but keep that in mind also.

MR. KATZ: That's fine. Okay.

CHAIRMAN MELIUS: We now have an update on our Subcommittees and Work Groups, and

I'll start off with Mark's report because I believe Mark had to leave the phone call after the Fernald discussion. And he just reports that there are meetings of the Dose Reconstruction Review Subcommittee scheduled and also the LANL Work Group has a meeting scheduled, both of those. I believe will still take place before the June meeting. Is there anybody else on the Board who wants to update us on their Work Group activities?

MEMBER MUNN: This is Wanda. I'll be glad to give you a short update on Procedures.

CHAIRMAN MELIUS: Go ahead, Wanda.

MEMBER MUNN: And when the Procedures Subcommittee in Cincinnati on the 11th of April. We are pleased to report that the database is coming along very well. We were able to manipulate live while we were working and we'll add one more column to the way the data is presented as we see it while we're working with it.

But most of the design is now

complete. The thing that is most beneficial to most of us is that the links are now hot and operating so that it's easy for us to move back and forth between the database itself and the links of the documents and other materials that we need to read in order to confirm that we're doing what we needed to do.

We have been working with a total of 540 findings. We have done -- about 68 percent of those are now closed. We have 78 remaining open or in progress. By in progress we mean we are actively working on them at the time.

We have 92 which are in abeyance that really means that they are closed as far as we are concerned, that NIOSH has to incorporate the result of the findings in some document. And until the document is actually issued and has been checked for completion.

And so far as incorporation is concerned, it remains on our list as in abeyance. They're resolved but not yet incorporated in those documents.

The summary reports for the website that we hope to have posted later this year are progressing slowly, partially the result of the Chair's inability to complete any of them, but we're getting there with them.

Our next meeting will be in mid-July. The exact date has yet to be determined. Our DFO staff is polling Subcommittee Members for an appropriate date that week in order to set that up. And that's where we are with Procedures; progressing well.

CHAIRMAN MELIUS: Thank you --

MEMBER BEACH: Jim?

CHAIRMAN MELIUS: Yes?

MEMBER BEACH: Oh, sorry. Go ahead.

CHAIRMAN MELIUS: I was just asking if anybody else had an update.

MEMBER BEACH: Yes, Jim. This is Josie. I have a short update for Mound. As you know, we're going to try and bring Mound issues before the Board in June. We had our last

meeting on April 10th and our next meeting is scheduled, tentatively, I haven't heard back from NIOSH's availability yet for June 5th.

We have two SEC issues we are still working through; Internal Dose Adequacy and Completeness. We're waiting for SC&A to provide a response to NIOSH's White Paper on thorium. And then NIOSH just owes us a remaining action items from an SC&A White Paper.

We're also dealing with tritium. SC&A is preparing a response to NIOSH's revised best estimate approach in their March 30th White Paper, and that is a focus of the uncertainties and assumptions that were made.

So we're waiting for those and hopefully we'll have our meeting as scheduled in June and be able to bring Mound before the Board at our June meeting.

Let me touch on radon. Radon was brought back to the Work Group and at the last meeting we decided in the Work Group that we're looking at a possible 83.14 for the years

September 1st, 1972 through December 31st, 1972, and then January 1st, '75 through December 31st, '76.

Those are the missing logbook dates. That is awaiting further action by a petitioner and we've talked about reporting to the Ombudsman for that. So that's where we are with Mound.

CHAIRMAN MELIUS: Thank you, Josie. Other Work Groups Chairs who wish to share a report?

MEMBER ROESSLER: Jim, this is Gen. Okay. I was on mute so I missed something there. Okay. This is an update on Linde. We're having a meeting in Buffalo next Monday, April 30th. This is not an official Work Group meeting, but a meeting to get more information, more input, from former workers.

There will be three of us Work Group Members there, SC&A representative, and a representative from NIOSH. We're pursuing more information on the tunnel issues we've discussed

before. These are TBD issues.

We want to get more information from workers on occupancy factors and we're also trying to confirm dates of construction of these tunnels. And then I expect we'll be reporting. I have a Work Group report at the June meetings.

CHAIRMAN MELIUS: Excellent. Thank you, Gen. Paul, were you going to report? Any other Work Group Chairs wish to report? If not, I have two reports to update.

One is that, for the SEC Evaluation Work Group, we had a brief conference call a week ago, I believe, to discuss how we would proceed on the issue of the ten-year update on, sort of, how to better define or understand how to apply the issue of sufficient accuracy in our SEC evaluations.

And this is simply an organizational Work Group call and at the time, NIOSH updated us on their efforts to, sort of, develop an inventory of how this issue has come up in past SEC evaluations. The inventory is going to be

prepared by the end of the next Board meeting, so probably some time over the summer, the Work Group will reconvene again to review that and discuss that.

The second update is Hanford. We're having ongoing activity. There's an active SEC that SC&A is evaluating and then we're also waiting on the 83.14 Evaluation Report from NIOSH that will, sort of, put the parameters on what further work needs to be done by the Work Group in terms of evaluating the Hanford issue.

I think you heard earlier that that report is expected in the next month or so and we will be prepared. We may have enough work done on our active SEC. We will (phone connection lost) 83.13, not the 83.15, so we may be able to report back on that at the meeting, but it's really probably too early to tell on that.

Any other Work Group --

MEMBER CLAWSON: Yes, Jim. This is Brad. I just want to give an update, a little

bit, on Pantex. We're still waiting for documentation. As you remember, when we put the SEC out there, there was the years from '84 to '94. NIOSH is supposed to be working on that paper and getting that back to us.

CHAIRMAN MELIUS: Any other Work Group updates?

MEMBER ZIEMER: Jim, this is Ziemer. Let me report on TBD-6000.

CHAIRMAN MELIUS: Okay.

MEMBER ZIEMER: That Work Group met, actually met twice in March on the 15th and the 28th. And we plan to come before the Board in the June meeting and provide a recommendation on the SEC for the active period.

I should point out that we have not yet taken formal action on the residual period and that needs to be included. So we may have to actually meet before the June meeting and formalize the residual period portion of that recommendation.

But in the meantime, let me remind

the Board Members that we've been distributing a fair amount of information, both from NIOSH and SC&A, on the approach to bounding doses at that site. And there's also been a number of documents from the petitioner, Dr. McKeel.

So we hope the Board Members take advantage of the time and look at all of those before the June meeting.

CHAIRMAN MELIUS: Yes. Thanks for that reminder, Paul. It might be helpful if, to have sort of an inventory of what are some of the key documents as well as, you know, other documents that would be useful that --

MEMBER ZIEMER: Yes. If necessary, I can get together with Ted and we can resend a package of documents to NIOSH; the SC&A and the petitioner's documents for that meeting.

CHAIRMAN MELIUS: Yes. Okay. I think that might be helpful, Paul, if only just to reference to where they are because I think that's --

MEMBER ZIEMER: Right.

CHAIRMAN MELIUS: -- useful for us. And I think also to make sure that no one don't put the key documents on the -- the titles and so forth that are not always -- or a little bit confusing in terms of telling you how important or what is covered in a particular document.

There may be a key issue in terms of the Work Group's recommendations.

MEMBER ZIEMER: Right.

CHAIRMAN MELIUS: Thank you. Any other Work Group updates? Thanks, everybody. We have one piece of Board correspondence. A letter that was received by the Board in March, late-March, and a draft response to that letter has been circulated to the Advisory Board for that.

And I think we've had, I believe, one comment, at least that I've seen, that was from Jim Lockey, Dr. Lockey, who made the excellent suggestion that, in the last paragraph, we indicate that the Chair is sending the letter on behalf of the Board.

So we're changing the I to the we in that last paragraph. We appreciate the work you and your father did. I think that was the only change we heard. I don't know if anybody else has any other suggestions, either say them now or email them to me.

MEMBER ZIEMER: This is Ziemer. I read the letter. I think it's fine.

CHAIRMAN MELIUS: Thanks. Okay. And then anything more to say about the June meeting? Ted. Ted, are you there?

MR. KATZ: I'm sorry. I'm speaking on mute again, but no, I have nothing more to say about June.

CHAIRMAN MELIUS: Okay. If not, then any other new business anybody wants to bring up? If not, I believe we can adjourn. Thank, everybody, and thank you for all the work, and input, and spending the time. I think we accomplished a lot in terms of Fernald and the business today. And we'll see everybody in Santa Fe in June. Thank you and see you then.

(Whereupon, the meeting matter was concluded at 12:48 p.m.)