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

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ADVISORY BOARD ON RADIATION AND
WORKER HEALTH

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WORK GROUP ON WELDON SPRING

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TUESDAY
FEBRUARY 14, 2012

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The Work Group convened, via teleconference, at 10:00 a.m. Eastern Standard Time, Richard Lemen, Acting Chairman, presiding.

PRESENT:

RICHARD LEMEN, Acting Chairman
DAVID B. RICHARDSON, Member

ALSO PRESENT:

TED KATZ, Designated Federal Official
RON BUCHANAN, SC&A
MONICA HARRISON-MAPLES, ORAU Team
DAVID HARRISON, ORAU Team
STU HINNEFELD, DCAS
KAREN JOHNSON
MARY JOHNSON
JENNY LIN, HHS
ROBERT MORRIS, ORAU Team
MARK ROLFES, DCAS
LAVON RUTHERFORD, DCAS
DAN STANESCU, ORAU Team
JOHN STIVER, SC&A
TINA TRIPLETT

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

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

(10:01 a.m.)

MR. KATZ: Okay. Dick, do you want to, then, lead? We have an agenda. It is posted on the website, and I believe there is a document associated with it which should also be posted on the website. That is the NIOSH website under the Board section of the website, under meetings.

And, Dick, it is your agenda, I guess. We don't have Mike here.

MEMBER LEMEN: Okay. I am not really prepared, but I will start and we will just follow the agenda and see where we go.

The first item on the agenda is the SC&A review of NIOSH response concerning the daily weighted exposure data. I believe that they submitted a report in January, and I believe Ron Buchanan was the senior person on that.

So, Ron, can you take over from

here?

DR. BUCHANAN: Okay. Thank you.

This is Ron Buchanan with SC&A.

Just to give you a little bit of background, we had a number of SEC issues and we have addressed those over the last year and a half, two years. One of the last ones was concerning the daily weighted exposures that was to be used for the thorium data air concentrations.

What this entails is that in the SEC evaluation, they did have a table in there of thorium air concentrations. One of the things that had been identified at other sites was what was the accuracy of this data. In other words, was there any errors in recording this data or the calculations?

And so, NIOSH went back and looked at some of the data from 1958 through `65 and did an error analysis on the air sampling data, the daily weighted average, to see what

the errors were, and they came up with the fact that they identified some errors in the data and that this was about a 2 to 4 percent error rate, which agreed somewhat with previously published articles in the Health Physics Journal.

And so, what SC&A did was try to see if this applied to the thorium data that was listed that was going to be used in dose reconstruction. So, we did an evaluation of this last summer or fall and issued a report in September of 2011. NIOSH responded to that report, and this was discussed somewhat at the 28th of November Weldon Spring Work Group meeting.

We responded to their response, which came out just a day or so before the meeting, which we didn't have time to analyze for the meeting. And so, the 17th of January, we responded to their second revision, or their first revision of their original paper.

What we found out was that we went back and looked at this 82 lines of data, which essentially NIOSH had gone into the data pool, looked at the method that was used to record this daily weighted average, and looked at the errors. And so, we looked at the 82 entries in there to see how they applied to thorium data. And so, this was our response of the 17th of January of 2012.

Essentially, some of it was carryover from what we had said in our September report. NIOSH did provide a section in there on how to apply the data and came up with the Monte Carlo simulation and the 4 percent error rate.

But we had questioned, SC&A had questioned the representation of the data to the thorium data that was used. The data that made up the 4 percent error rate came from 1958 to 1965.

Now I am summarizing.

Mark, you can correct this if I am

wrong when you explain your position on it. But we found that 82 lines in there was from `58 to `65, the sample, and we had several problems with it. Number 1 was there was a limited amount of sample in data of the original handwritten material. And so, you could only go back to the handwritten material to analyze errors to see how they transcribed or miscalculations. And so, the error rate was determined from looking at all this data.

The No. 1 question we had there on our paper was that the data was limited, but not all of it was used. And so, we could not see what the criteria was for what data was used and what wasn't used. It didn't seem to be the highest data, the highest daily weighted average. So, we weren't sure why some of it was used, some of it wasn't.

And secondly, of the 82 lines of data, from `58 to `65, only 17 corresponded to the thorium error data taken. The thorium

data did not have any of the raw data recorded. The way my understanding was, there was no raw data, and I couldn't find any raw data on the thorium. It had the summary results.

And so, we are applying the uranium taking data over `58 to `65 to thorium data from `63 to `66 to determine the error. Now we are not using the same data. We are just saying, what could the possible error rates be?

And so, we found that only 17 of these lines, these entries, corresponded to the `63-to-`66 error that the thorium was used, and that would be applied to in dose reconstruction. So, you could see that there would be different operators taking this data at different times.

So, we have mainly the problem in our summary, as we say, of the representativeness of the uranium data that

was used to determine the 4 percent error rate. Is it applicable to the thorium data? Why wasn't all the data used?

John Stiver, would you like to add anything to that? That is a summary of that paper that we turned in on the 17th. You have worked on this at Fernald and some of the other sites. Would you have anything to add to that?

MR. STIVER: Yes, thanks, Ron. I think you summarized it pretty well, although I would like to make a distinction here.

When we are talking about the limited data, there is an issue not in the representativeness as an issue, not because necessarily we are looking at thorium or high DWEs, because we are essentially looking at a human error rate in transcription. So, I mean, it doesn't matter; when you are using it, you are looking at the same process. Basically, you are looking at the exact same

calculations for DWE, whether you are looking at thorium or uranium.

So, the nuclide or the magnitude of the particular DWE doesn't count. What counts is which operators were doing the calculations and whether the operators who were sampled in this small set of data can be considered to be representative of the types of errors that might occur during the period when we are interested. And so, I think we ought to make that distinction.

As far as the approach they used, I think it is a very scientific, credible approach, doing the Monte Carlo calculations of the distribution of DWEs without the blunders or the errors as a baseline set, and then constructing an error rate distribution at the rate at which the errors occur during a Monte Carlo calculation or simulation. You go out and sample from that error distribution and, then, create a second distribution for

comparison as a baseline.

And that is what they did, and they found about 2.5 percent higher at the geometric mean and 4.5, 4 percent or so, at the 95th percentile. And so, this was a little higher than what you might expect from the human error rate, which is typically about 1 percent or so.

Although what was kind of interesting is it did look like they captured one of the bad actors here, if you want to call it that, because I think it was 40 out of 50 of the arithmetic errors were attributed to one operator who made the same mistake 41 times. And so, when that particular person was removed, you are looking at close to about a 1 percent error rate, which is kind of a random-type area you consider.

But that does kind of raise the question of, well, you captured one guy who was making a lot of mistakes, but because you

have such a limited dataset, were there potentially others that might have resulted in more error? I guess the bottom line on this whole exercise is that 4 percent of the 95th percentile is not really all that large of a magnitude, I think the reason being that most of these errors result in a factor of two or less under-representation and some result in an overestimate. And so, there is a tendency to balance each other out a bit.

And it is also interesting that the magnitude and types of errors that were identified in this dataset were virtually the same as identified in the Adam Davis and Dan Strom paper from 2008, which is the fundamental basis for the uncertainty estimates that are used in the DWE coworker model.

That's really all I have to say. I would say SC&A is fairly satisfied with the approach. We are a little concerned that the

data may not be, because it is such a small dataset, that it may not be representative of the full range of errors that may have occurred.

That's all I have to say on the subject.

MEMBER LEMEN: Okay. This is Dick Lemen.

Before we go to NIOSH for their response, could I ask Board Member Richardson, I know that you had comments in the Tampa meeting. Would you have any comments at this time, Dave?

MEMBER RICHARDSON: I was less concerned about kind of the error issues than going back to what sounded from your report about perhaps the lack of clarity in how NIOSH had selected the data or the lines of data, as you are describing them, for inclusion versus exclusion. Is that still on the table, this issue that you called representativeness of

the limited data?

MR. STIVER: This is John Stiver again.

We would like NIOSH to at least identify what the criteria were for selection because it looks like there were some handwritten calculations that were not used, but there was no explanation as to why they were excluded from the analysis.

MEMBER RICHARDSON: Okay. I would just like to keep that, because, to me, it sounds like it was a question that you had posed before that hadn't been addressed and it has been posed again. I don't want to lose sight of that.

MEMBER LEMEN: Any other comments, Dave?

MEMBER RICHARDSON: No, that's it.

MEMBER LEMEN: Okay. Mark Rolfes, do you want to make any comment on this? Or is there someone else at NIOSH that would

rather speak?

MR. ROLFES: Well, I will give a sentence or two, and, then, probably refer to Bob Morris here to answer some of the technical aspects of things.

I think SC&A summarized both their position as well as our position pretty well. Let's see, we used the raw data that were available to us. Although we might have had a summary report much more frequently, we didn't always have all the raw data available to us. So, we used the raw data that we had available to us.

I think we covered about 1400 different operations and had about 80 pages of data that were analyzed to look at the error rates or blunders in the daily weighted exposure reports. And then, we went back and corrected those blunders and came up with the roughly 4 percent difference in thorium intake at the 95th percentile, once we addressed all

those errors in how the data was recorded and reported.

I think, as far as the number of operators that were involved in completing these reports, I believe that was a limited number of people who were reporting these results.

That is my intro, and I would like to turn it over to Bob to maybe address some of the specific questions and concerns regarding the representativeness of the data. That is the biggest concern that we are discussing.

MR. MORRIS: Okay. Hello. This is Robert Morris. I am a health physicist with the ORAU team.

As you said, I think we have all agreed this is a rehash of what I said in our last Work Group meeting, which is that we had no bias and no sampling plan going into the process of identifying. I mean, we had

initially hoped to identify DWE reports and the corresponding raw data that went into generating those reports and then selectively picked the ones that were very pertinent to the operations of interest.

When we got into the data and actually looked to see what was available, what we found was that the raw data were not available with the reports, and it was only in rare cases where we could make a positive association between a worksheet and the daily weighted exposure report.

Excuse me. At some locations, they called it daily weighted average. At some locations, this practice was called daily weighted exposure. So, since I have been working on sites that have these in common, I am using the term identically. I don't mean to imply there is any difference in the process, whether I use the word exposure or average at the end.

So, what we found was that we have identified all of the data in our evaluation that we could positively associate with the daily weighted exposure report. And then, we took all of that data and we sampled it. As you said, the blunders we identified are tabulated at the end of the report. I think we identified about 1400 opportunities to make a mistake, and then we identified the 80 mistakes, or something like that.

So, I am a little bit puzzled because the report that we got back from SC&A with the critique on this doesn't really give us the specifics of what we did wrong in terms of finding data that they succeeded in finding. I think that is one of the comments that you have had, but we haven't been able to substantively address that because I don't have the details.

So, maybe I will just throw that back. If it is of interest, we need more

information to actually follow your leads that were developed, Ron and John.

MEMBER LEMEN: Does SC&A have something to respond to that?

MR. STIVER: Ron, did you want to say anything?

(No response.)

MR. STIVER: I am not aware of what data that may have been available that wasn't used. It was just our understanding that maybe there might have been some available data that was not used. From what Bob Morris is saying, you did indeed capture all the data that were available that could be associated with DWEs, is that correct?

MR. MORRIS: Well, that was our intent. We worked hard to try to find the data. I am not saying we were perfect in finding all of it, because, you know, it is spread over hundreds, or perhaps thousands, of pages of handwritten records. But, you know,

we made a good effort to try and find it, and we spent a bit of time on it.

If you have some other leads for us, we will be happy to look at them.

DR. BUCHANAN: Okay. Yes. This is Ron Buchanan with SC&A.

Okay. So, I went back and looked at some of the Site Research Database references that you provided. Some of the data, the handwritten data was like it might be pages 8 through 14 and maybe the ones that you referenced was page 8 and 11, or something. And then, there was other data in between, if I recall right.

Are you saying that you didn't have the summary report that corresponded to those other sheets?

MR. MORRIS: In general, that would be the case. We couldn't make a positive relationship between an air sample result, for example, and the daily weighted

exposure document that it may have been associated with. Where we did succeed in finding those positive, direct relationships between a data entry on a form and an exposure is where the working papers happened to have been filed along with the final report. That generally was not the way they have handled the record at Weldon Spring.

And then, we were hesitant, if there was an air sample, well, could this air sample have been associated with that daily weighted exposure report? It could have. Could we prove that it was? No, we couldn't. There was a lot of ambiguity in the relationship because the working papers were associated with the final reports.

DR. BUCHANAN: Okay, yes, I guess that is the clarification that we hadn't had in the past. Let me reiterate a few things here so we understand each other.

You are saying the summary report

or the calculations were done and the raw data; you wanted to make sure that those two correlated, and there might have been more raw data there available but you didn't have a summary report that correlated exactly with that. And so, you didn't use, say, page 9 and 13 and 11 because it didn't correlate to a given summary report. Is that correct?

MR. MORRIS: You said it well, Ron.

DR. BUCHANAN: Okay. And so, there was more raw data than you could use because you didn't have the summary report that showed the calculations and that you could do an error analysis on.

MR. MORRIS: That's correct.

DR. BUCHANAN: Okay.

MR. MORRIS: We didn't want to use data that we couldn't correlate to a daily weighted exposure report. We knew that there were air sample results out there that were

not directly mapped -- that we chose not to use because we couldn't map them to a daily weighted exposure report.

DR. BUCHANAN: Okay. That is a clarification that we needed.

And then, also, I just want to clarify another issue is that the thorium data did not have any of the raw data with it, right? The thorium data was only summary reports and you couldn't cross-compare it to the raw data?

MR. MORRIS: Yes, we tried hard, and we could not unequivocally make those correlations of this air sample correlated with this report. So, we chose not to use them instead of trying to be misleading. We wanted our conclusions to be directly supportable.

DR. BUCHANAN: Okay. Well, John, I think that that answers our question on why were there more data. When I looked at it, I

seen there was more data, but it wasn't used. It is that there wasn't a calculational sheet to go along with the raw data. And so, I think that clarifies it for me. Do you have any other questions on that?

MR. STIVER: No, that clarifies it for me, too.

MR. MORRIS: So, back to my comments further, then, I wanted to point out that, in the interim since we did the Weldon Spring evaluation of the errors and blunders -- and this has always been a touchy subject about whether we caught blunders -- NIOSH did not invent this term about blunders. It comes from an ISO standard about how to express uncertainty. And blunder is a technical term in that. So, if I use that word, it is not in a derogatory manner in any sense. It is just it happens to be the technical language of that standard that we worked against.

So, when we actually got the

commission from another Work Group to do this same evaluation at Fernald, the Fernald records were organized differently. We were able to identify about 17,000 records or data points or transcription opportunities or calculational opportunities that were available in the sample that we picked at Fernald.

We spent two or three weeks. Because we knew how bad the representation of the data was at Weldon Spring, we thought, well, let's go look at a sister plant with an identical process, an identical procedure, and again, transcribing and transcriptions and calculations without calculators.

And so, we overdid the sampling at Fernald. What we found was that the error rate at Fernald was significantly less, closer to the 1 percent, as you might have expected. The impacts were about half as much as they were at Weldon Spring. Again, Fernald was

below both the Adam Davis/Dan Strom evaluation for AWE sites and for the Weldon Spring site.

So, we have got one more important data point on exactly how humans interact with this procedure that was invented at the Health and Safety Lab of the DOE in the 1940s, and find again that the error rates are pretty much where you would have expected them, based on our observation from this Davis and Strom paper.

So, when we look at this all together, I think that you can say that this is a snapshot of data that confirms the idea that the human errors that went into the calculations are limited, essentially, because you are trying to report a number between a minimum and a maximum as an average value, and if you have a number that is below or above that minimum/maximum, any proofreading is going to discover most of those errors. If your average is higher than your maximum, you

sort of go, that was a big mistake and you redo it.

So, inherently, the magnitude of the errors is somewhat constrained, and the impact of the errors tends to take the median value where SC&A has recommended we do calculations for intake rates for most people, and it is in the 2 or 3 percent range. It increases about 2 or 3 percent.

So, we feel that we have answered a question that was specifically asked and have shown that the impact of the human blunders on the uncertainty of intake rates calculated at Weldon Spring for daily weighted exposure methods is not large and can be bounded.

COURT REPORTER: Speaker, please identify yourself.

MEMBER LEMEN: This is Dr. Lemen.

I ask NIOSH, in light of the discussion we have just had, what they feel

the next steps should be with the Weldon Spring dataset. Do you have a recommendation of where we should go with Weldon Spring at this time?

MR. ROLFES: Well, this is Mark Rolfes.

As of right now, what we have proposed in our Evaluation Report, that we can bound thorium intakes based upon the daily weighted exposure values that we have just discussed. We now have presented information showing that the intakes calculated from the daily weighted exposure data are reliable and have a small error associated with them of 4 percent, which is pretty insignificant.

We have previously been assigning thorium intakes for the Weldon Spring plant based upon information from the Fernald facility. We have presented this new daily weighted intake approach to demonstrate that the thorium intakes can be bound.

So, ultimately, I believe it is in the Advisory Board's hands to decide whether or not our proposed method of doing thorium dose reconstructions at the Weldon Spring plant is agreeable to them, is agreeable to the Advisory Board.

MEMBER LEMEN: Dave Richardson, do you have any further comment at this time?

MEMBER RICHARDSON: No, I don't.

MEMBER LEMEN: With that in mind, I am not sure if it is appropriate -- do we need another recommendation in writing from NIOSH to the Board, or where do we go from here, Ted? I'll need your help on this one.

MR. KATZ: Sure. Hi. This is Ted Katz.

I think this conversation has been excellent for clarifying matters that weren't clear. So, I think the transcript is probably adequate without a new report, although, ultimately, depending on how this is handled,

if there is a TBD revision, for example, down the road, that things would be stated more clearly there, and what have you.

So, I am not sure that there is more for NIOSH or SC&A to do on this front. It is really now a matter for the Work Group to consider, just as Mark said, what your judgment is on this, and then to report this out the Board, which can consider the same matter.

MEMBER LEMEN: Do you think that we would be able to, unless Dave has an objection to this -- and I haven't talked to Mike, who is the Chairperson; ultimately, he has the final say -- that we, as the Board, could, as the Working Group, I mean, could present to the Board in the February meeting what we have gone over today and then get the Board's comments, and go ahead and close this matter out and get Weldon Spring moved forward?

MR. KATZ: Yes, Dick, this is Ted again.

So, I mean, this is one of the two matters the Board wanted the Work Group to finish up on. Yes, I agree, I think you can report this out, either Mike or yourself, depending on who is in attendance.

You know, reporting it out, I guess you have to make a judgment as to whether you are satisfied with this method or not. Your recommendation is to the Board. You know, the Board will make its judgment, but it is useful to have a recommendation from the Work Group as to its view on each of these matters.

MEMBER LEMEN: Okay. I don't know how to get a hold of Mike. But if you can do that, Ted, maybe --

MR. KATZ: No, Dick -- I'm sorry, this is Ted again. Mike, if he is not in attendance, he is not part of the

deliberation. I mean, so it is really --

MEMBER LEMEN: Up to me and Dave?

MR. KATZ: It is really you and Dave that are here to make a judgment for that. Again, it is not really a critical matter. You are reporting out to the Board, but the Board will take up the matter itself as a whole and make a judgment.

MEMBER LEMEN: All right. So, with that said, I suppose we should go to the next item, and we can, at the end of this, where we have a discussion of report to the Board, we can decide where we go from there.

But the next item happens to be the response to Brad Clawson, Member of the Board, from NIOSH. Could you talk about that, NIOSH?

MR. ROLFES: Sure. Thanks, Dr. Lemen. This is Mark Rolfes again.

At the December Board meeting in Tampa, Brad Clawson had identified a document

that was written up, I believe, as part of an epidemiology study conducted by Oak Ridge Associated Universities around 1991.

This document, the subject was Mallinckrodt Chemical Works: Four-Plant Study Classifications of Radium, Radon and Thorium Exposure. This document had basically described historical use of various radionuclides at Mallinckrodt as well as Weldon Spring.

I will go over my response. Basically, Brad had identified this document, Brad Clawson, and also Jim Lockey had mentioned it to me in the hall at the Board meeting, that this document had identified that there was thorium production operations going on at Mallinckrodt and then, subsequently, for the time period of 1958 through 1966, at the Weldon Spring plant.

When this was identified in this document, it was identified as thorium

operations. And so, that is what I believe had caught Brad Clawson's eye, was that there was thorium processing going on at Weldon Spring plant for this entire time period.

The thorium processing that was done was the extraction of thorium-230 from the ore concentrates, the uranium ore concentrates, and not necessarily production of thorium-232, which only occurred from 1963 through 1966 at the Weldon Spring plant.

So, this document had identified plain thorium. It didn't specify necessarily in the text whether or not it was thorium-230 or thorium-232. You have to read the context of the report to determine whether they are referring to the extraction of thorium-230 from uranium ore concentrates or whether they are referring to the production of thorium-232 metal, for example.

That was the clarification that I had. Basically, all the information that we

have gathered and all of the research that we have conducted indicates that thorium-232 operations were conducted in short campaigns in the time period of 1963 through 1966. We also have information on the specific operation and the duration of those campaigns, by building, within our Evaluation Report.

I don't recall what table it is right off the top of my head, but if you give me just a second, I can pull that up and identify it for the record. Let's see. I am flipping through my report at this time.

Let's see, in Table 5-2, we have a chronological summary of thorium operations at the Weldon Spring plant and we have given an operation title, the building number and the time period broken down by month and year that operations were conducted in each of the buildings. This is on page 19 of our Evaluation Report for SEC 143.

MS. JOHNSON: Mark, this is Karen

Johnson, petitioner.

MR. ROLFES: Yes, Karen?

MS. JOHNSON: Can you tell me what source was used for that table?

MR. ROLFES: Let me see. Under the table, in our Evaluation Report, we have the source. The note says, created with information from Weldon Spring feed materials, summaries of dust concentrations at production jobs. And it is MCW, 1958 through 1966.

If I go back to the end page -- excuse me -- back to the reference section, let me see if I can get you any additional information that might help you.

Okay. It is MCW, 1958 through 1966, summaries of dust concentrations at production jobs, Weldon Spring feed materials plant, Mallinckrodt Chemical Works, Uranium Division, 1958 through 1966. This came out of our Site Research Database.

MS. JOHNSON: Okay, so you have

any original time period document?

MR. ROLFES: Yes, we do.

DR. BUCHANAN: This is Ron Buchanan of SC&A.

Karen, also, I went back and checked this out, double-checked it. The reference ID, I don't know if you have access to the reference ID, but the reference ID 0400 and 8252, verifies the receipt of thorium at Weldon Spring.

MS. JOHNSON: Okay. Thanks.

MEMBER LEMEN: Any other questions, Karen?

MS. JOHNSON: I actually do have a question back on raw data for thorium, on the first item. I guess I am confused about how that is being calculated, because I thought I heard somebody say there is no raw data for thorium.

MR. ROLFES: This is Mark Rolfes, Karen.

The method, we were basically addressing the error rates in the methodology that was used to determine an individual's airborne exposure, irregardless of the type of radionuclide. This method was, this daily weighted exposure method was used for uranium as well as thorium. We had a positive association between a Daily Weighted Exposure report and raw data that we can conclusively say that this raw data was used to develop this DWE report.

We focused on those relationships where we knew that this raw dataset was associated with this particular report. It may be that we have raw data for thorium operations. However, we weren't able to conclusively say that these data were tied to this evaluation, Daily Weighted Exposure Evaluation Report.

Does that answer your question?

MS. JOHNSON: Yes. I guess I

really just am not trusting all of this data. To me, that's a lack of data. So, I guess I am just not agreeing with the process.

MR. ROLFES: Now, keep in mind, we do have the summary data for thorium exposures. We just didn't have the raw data available, and we are using the summary data available to us to assign thorium intakes to Weldon Spring plant workers.

MEMBER LEMEN: When you say "summary intake" -- this is Dick Lemen again -- when you say "summary intake," could you be a little bit more specific on that?

MR. ROLFES: Well, we had the range of concentrations, the air concentrations, to which a worker might have been exposed. However, we don't have the calculations that support those air concentrations in all instances, that we can conclusively say this dataset was used to develop this report.

MEMBER LEMEN: So, you cannot say for any individual exactly what their exposures were?

MR. ROLFES: Well, one couldn't conclusively say what any individual's exposure was. What we are doing is assigning an intake that is bounding, and we believe will overestimate the actual intake incurred by workers at the Weldon Spring plant.

MEMBER LEMEN: But this is taken from summary data and not from actual measurement data on the worker, is that correct?

MR. MORRIS: Mark, this is Bob. Can I interject?

MR. ROLFES: Yes, Bob. Yes, please.

MR. MORRIS: This is Robert Morris with ORAU team.

Dr. Lemen, to address your question, when we say "daily weighted

exposure," what we are trying to convey here is that there is an average air sample concentration that represents the workplace. And so, for example, we will take an air sample -- I don't say "we". I take this as my data analysis, I have used it so often, but it is not my data.

An air sample would be taken to represent the concentration in a room, for example, on three or four different days. Those would be averaged. That average, then, goes into the calculation of how often a person was in that room.

So, what we have got is the final report that says this person was in this room for 10 minutes and the average concentration was 100. And so, you weight that into how many minutes are in the day, and that is how you do a weighted exposure.

Now what we are missing, in terms of the raw data being directly associated, is

maybe there were four air samples, as I said, taken to represent the concentration in that room. We can't tell you which four air samples in the large list of air samples that were out there were the four that went into getting the average. But we do have the average.

MEMBER LEMEN: Okay.

MR. MORRIS: So, when we say can't go all the way back to the raw data, that is true. But there is really no reason to think that people can't take average numbers and, in general, report them correctly.

We have actually quantitated how important those -- when people do make mistakes, how important those mistakes are, and they seem to have a 2 to 4 percent impact increasing the outcome -- increasing the intake rate calculation.

MEMBER LEMEN: Bear with me a second.

These are general room samples? Is that what you are telling me?

MR. MORRIS: I am using general room samples as an example. We also would take samples representing a process. Maybe it was opening a container. Maybe it was loading a furnace. And each of those would have been sampled a few times to get the average air concentration that occurred when that event occurred.

MR. ROLFES: Bob, this is Mark.

To clarify what you said, and maybe help explain, Dr. Lemen, they might focus on one chemical operator doing a drum-dumping operation for an hour at a given air concentration. And then, in combination with that one-hour exposure at that air concentration, they would also say, well, he was also in the area while someone else was doing the work for 30 minutes, and they would apply a general area air concentration for

those 30 minutes. Then, they might have tracked him to another job possibly or to lunch and had either a breathing-zone-specific air sample result or the background air concentration result for a given amount of time in the cafeteria. So, those are all combined to add up to an eight-hour day or an eight-and-a-half-hour day. I don't recall which one was used.

MEMBER LEMEN: So, what you are saying is that, while he is working, there is sampling being done. And then, they may follow that worker while he is on a break or in the lunch room and continue that sampling. And then, the average is taken from both of those areas. Is that correct?

MR. ROLFES: The worker --

MR. MORRIS: That is correct. In fact, this method has been used ever since it was first invented at the Health and Safety Laboratory in the 1940s. It has been used up

until today in industrial hygiene practice. And it is a very common approach to trying to define the exposure potential of a worker, whether he is working around, he or she is working around gasoline vapor or dust -- silica dust. This daily weighted averaging concept is widely used.

MEMBER LEMEN: I know that, but I was concerned about the sampling being taken in the work area and then averaged with sampling taken where, supposedly, there is no exposure in the cafeteria area.

MR. MORRIS: The 30 minutes in the cafeteria is part of the daily exposure. And so, that is included in the time-weighted average exposure for the worker.

MEMBER LEMEN: Okay.

MR. MORRIS: We have described that in our original paper on how daily weighted exposure measurements are done.

MEMBER LEMEN: I understand.

MR. MORRIS: That sort of goes back, what, two years, is that right, John Stiver?

MR. STIVER: Yes, that is about right.

I think the important thing is that, for any given worker, there are going to be a series of breathing zone samples. There would be a lapel-type sampler to try to get a more representative sample of a particular operation that might have involved a higher exposure potential.

But, say, scrubbing out a reduction pot liner, or something, one of the dirtiest jobs. Very high concentration, but relatively short duration, maybe about 30 to 45 minutes, if I recall correctly.

And so, what they do is they follow this worker. They outline the different tasks involved in his particular job. So, for each one of those tasks, there

is a certain time allotment associated with it, and, also, concentrations. For those operations that are particular to that job, they would use the breathing zone samplers. And then, for, say, going to the cafeteria or changing out in the locker room, and so forth, they would use a general air sample to represent the time spent in that particular environment.

And then, at the end of the day, basically, what we would have is about eight-and-a-half hours' worth of time, total time, allocated among these different tasks. And so, we would multiply the concentration, the average concentration for a task, times the time it took to take that task, sum all those values up, and then divide by the total time. That gives you the weighted average.

MEMBER LEMEN: Dave Richardson, do you have any comment on this approach?

MEMBER RICHARDSON: No, not on

this approach.

MEMBER LEMEN: Are you satisfied with it?

MEMBER RICHARDSON: Yes.

MEMBER LEMEN: Okay. Any other comments on this particular area?

MS. JOHNSON: This is Karen Johnson again.

I guess I am still confused because I have been told over those years that there were very few air samples taken at Weldon Spring. Can you comment on how many samples there actually were?

MR. ROLFES: This is Mark Rolfes.

Bob Morris has spent quite a large amount of time going through the air sampling results. I would defer to him at this time.

I can get a response back to you on a better idea of the number of air samples. There is definitely a large quantity of air sampling data, and I think we had identified

in these daily weighted exposure reports roughly 1400 different operations which were air-sampled. Now this is just what was available to us at the time we did the analysis. I believe there probably are additional air samples.

But, Bob, maybe if you might have a better feel for the quantity of air samples available from the Weldon Spring site?

MR. MORRIS: Sure. I don't know the number. We certainly can make an effort to try to find that, about what is available in our record-set.

But I think it is worth noting that there was a person whose job it was, maybe two people whose job it was, to go out and sample air routinely around the plant. There are air samples representing most days at some place most days.

So, I don't think it is accurate to say there were very few air samples taken.

Somebody's job was to go take air samples.

MS. JOHNSON: Okay, and one of my concerns is, in speaking with hundreds of workers over the last 10 years, none of them remember having their area monitored for air sampling or their breath sampled.

MEMBER RICHARDSON: And this is David Richardson.

I think what was said, both things that have been said probably are true. I mean, it is getting to a distinction between what is meant on average to be able to characterize a place and a time and what would be necessary in terms of data collection to characterize a person's potential exposure and its variation over time, over decades.

So, while there are many samples that were collected, you are being asked to extrapolate from those samples to characterize exposure concentrations that were dynamic and were not identical for everybody in every

place. So, if there was one or there were two people who were moving through collecting samples, that is not the same as an individual having experience in a plant and having a recollection that they were wearing an air sampler the way that somebody might wear a radiation dosimetry badge, and have to wear it every day onsite while they are being exposed. It wasn't that kind of monitoring program.

MR. MORRIS: That's right, and you have put your finger on a real key. That is one of the items that we have had long conversations about over the past two years. That is why we have as an uncertainty estimator value. When we take the value that is reported in the daily weighted exposure dataset for a given building for a given year, we multiply that. It has got an uncertainty factor of plus or minus a factor of five associated with it, unlike most of the kinds of internal dose assessments we do, which has

a multiplier, times or divide factor of three.

So, this has got a really large uncertainty factor associated with it to accommodate just exactly what you raised as a concern. That is called the geometric standard deviation as opposed to the standard deviation, which is a plus-or-minus kind of uncertainty. This is a times-or-divide kind of uncertainty. So, it really spans a big range of data when we put that in, and it becomes very favorable to the claimant by this approach.

MR. ROLFES: Karen, this is Mark Rolfes once again, regarding the number of air dust samples that were taken.

I am looking back through our Evaluation Report, at the end on page 80 of 90. We have listed a summary of the holdings that we have in our Site Research Database for the Weldon Spring plant. It doesn't tally up the quantity of air sample results, but it

does give you a feel for how many documents we might have that contain radiation monitoring information, air dust sampling results.

Just looking back on page 80, about in the middle of the page, we have a statement that we have uploaded, roughly, 230 documents back in 2009 with information that had urine and air dust samples, radiological surveys, air pathway analyses. Let's see, the next on there, there is some additional sampling information.

If you would like maybe a better estimate of the number of air samples that were collected, we can see if we can possibly get a better response for you.

MEMBER LEMEN: Is it possible to get that to the claimant and to the Board, just so we will have it on record?

MR. ROLFES: We sure can. We will work to get that as best we can as soon as possible. This will just be a ballpark

estimate that we will try to get to you as soon as we can.

MEMBER LEMEN: Are there other questions from the petitioners at this time?

MS. JOHNSON: I don't have any more. Thank you.

MEMBER LEMEN: Any other petitioners with questions?

(No response.)

Hearing none, I guess the last item --

MEMBER RICHARDSON: Yes, before we move to the last item, during this discussion we sort of moved back to the agenda item 1. I would like to close out with the second item, about processing dates or operational dates.

MEMBER LEMEN: Okay. Who is speaking?

MEMBER RICHARDSON: David Richardson.

MEMBER LEMEN: Oh, hi, David.

MEMBER RICHARDSON: Hi.

MEMBER LEMEN: Go ahead.

MEMBER RICHARDSON: Am I correct in understanding the discussion today that a substantial basis for the dates, for establishing the dates on which thorium processing was done is the air monitoring data? That seemed to be the description of kind of the cited information for the dates that were quoted from the table.

MR. ROLFES: Yes. This is Mark Rolfes.

And the reference that we had identified was the dust study document, I believe. I don't recall if we had conducted any kind of interviews. Maybe Bob might be able to remind me.

Do you recall if we asked anyone from the Weldon Spring plant?

MR. MORRIS: Yes, we did interview

people and asked those questions. But, frankly, it has been years now, and I don't remember the specific answers. But we did look into more than one source of data to try to find the operational dates.

MR. ROLFES: I think that is correct, Bob. From what I recall, I think maybe Karen and the petitioners may have identified this issue to us during our Evaluation Report.

Let me see if we have addressed this or discussed anything additional here in our Evaluation Report. I am not seeing it jump out at me at this second.

But I know we did hear this concern from the petitioners, and this was something that we did conduct a series of interviews about. Yes, there were concerns about, let's see -- is that correct, Karen? Am I stating something that is correct? I thought you did express earlier concern about

the thorium exposure potential in earlier years of the site. We have discussed this before, I believe. Is that accurate?

(No response.)

Karen?

MEMBER LEMEN: Karen, are you still there?

MS. JOHNSON: This is Karen.

I do recall, that has been a big concern of ours because, as we have gone through FOIA documents, we have compiled a small stack of documents that do state that thorium was processed on a larger-scale basis. It appears they are talking of thorium-232. I don't know for sure.

Tina may know more about some of that than I do. I don't know if she is still on the line.

But that is a big concern of ours because we are not sure where the `63 to `66 is coming from.

MEMBER LEMEN: In what respect do you mean that? Can you explain a little bit better?

MS. JOHNSON: Well, we have just seen in the Site Profile, in an Evaluation Report, it is stated that thorium processing was done between 1963 and 1966 and that it wasn't there earlier than that, maybe for a very brief period at one point. But we are not sure what references are being used to determine that.

MEMBER LEMEN: Well, do you have evidence that it was there before 1963?

MR. ROLFES: I think the reference that Karen is mentioning was the same one that Brad Clawson had identified during the Advisory Board meeting in December. And that was the reason for the preparation of our response on basically separating out thorium-230 extractions from uranium ore concentrates versus thorium-232 production.

DR. BUCHANAN: This is Ron Buchanan with SC&A.

If you look at reference ID 8252, pages 26 through 29, and especially table 6 on page 28, it gives the receipt of thorium at Weldon Spring. It shows their inventory and their incoming and outgoing inventory receipts each year from `58 through `66, through `67, actually. And that inventory sheet shows that it was that they didn't really ramp up until `64, actually.

They had 44 kilograms in a barrel that apparently remained unopened. It was on every year, the same amount. And then, in `63, they received 5 kilograms, and then, in `64, they received 13,000 kilograms; in `65, 313,000 kilograms; in `66, 614,000 kilograms, and none in `67.

So, that was a base document that I found on the Research Database. It is 8252.

MS. JOHNSON: Ron, this is Karen

again.

I guess that is something that we are at a disadvantage with. We haven't seen any receipts for shipping or inventory. Is there any way we can get copies of those?

MR. ROLFES: Karen, this is Mark.

You certainly can request this information under the Freedom of Information Act. And I believe you are familiar with that process.

MS. JOHNSON: Yes.

MR. ROLFES: If you have any questions --

MS. JOHNSON: Okay. We thought we had already requested absolutely everything.

MR. ROLFES: I think you requested everything related to thorium operations. I actually had gone through some of these documents to identify which ones had information related to thorium.

MS. JOHNSON: I think we did

receive a small number of receipts, but it appeared that was all there was for Weldon.

MEMBER RICHARDSON: Just as a comment, and I haven't been on the Board that long, but if that type of inventory information was available and could be included as supporting basis in any of the documents related to this, that would seem to me more standard, in my limited experience, with describing the dates than relying on air monitoring, kind of the period during which monitoring was done.

Because, personally, I start to have a level of discomfort with saying, because there was monitoring done or not done in a period, there was potential for exposure. It is almost putting the cart before the horse.

MR. ROLFES: Sure, sure.

MEMBER LEMEN: So, you will provide that?

MR. ROLFES: I am sorry. This is Mark. Dr. Lemen, in order for us to provide this reference, if we have not provided it yet, we would have to receive a FOIA request from the petitioners.

MEMBER LEMEN: Well, I thought Dave just asked you to provide it, too.

MR. ROLFES: Oh, we certainly can provide it to the Advisory Board. However, we can't provide it directly to the petitioners without a FOIA request for it.

MEMBER LEMEN: I understand that, but, as I understood what Dave just said, I think he was requesting you provide it to the Board.

MR. ROLFES: Oh, sure.

MEMBER LEMEN: Is that correct, Dave?

MR. ROLFES: Definitely. We can identify that document and provide it.

MEMBER LEMEN: That is what you

were asking, right, Dave?

MEMBER RICHARDSON: Yes, I was also sort of thinking -- I don't know where you are with closing this issue out, but in terms of technical documents, whether it is the Site Profile document or something else, that it would become part of the cited literature and the basis for setting these dates.

MEMBER LEMEN: Okay. If we could ask you to provide that to the Working Group, I would appreciate it.

MR. ROLFES: I sure will.

MS. TRIPLETT: This is Tina Triplett.

And there are several documents that show that thorium was processed since 1958, actually, even from the Atomic Energy Commission. So, I am not sure. I mean, if it is there, it should be given the benefit of the doubt to the petitioners that it was there

the whole entire time.

MEMBER LEMEN: Can you respond to that, Mark?

MR. ROLFES: Yes. Thanks, Dr. Lemen.

Tina, this is Mark.

If you could provide these documents to us -- I haven't seen anything different from what we have available to us from ORAU's epi study that I had referred to earlier. If you might be able to send in these documents to us, we would definitely take a look at them.

MS. TRIPLETT: Okay. I am pretty sure that this information you already have because this is some of the stuff that came in the FOIA request. But there's tons of documents out there that state it was there the whole time. So, I can send you what I have, but you should already have it.

MR. ROLFES: That would be great,

if you could identify those documents.

MEMBER LEMEN: Would it be appropriate -- I don't know, like Dave, I am new to the Board; I have only been on a short time -- but is it appropriate for us to ask NIOSH to get together and discuss these documents, since it appears they have already been provided in the FOIA, with the petitioners, so that we cut down on some time? In other words, the two of you just directly talk to one another.

MR. ROLFES: I am definitely available to have any sort of discussion needed. If there is information regarding thorium processing earlier on, it would be new to us. We have no indication that there was any kind of thorium-232 operations being conducted at the Weldon Spring plant prior to 1963, and that is consistent with every source of information that we have available to us.

MR. HINNEFELD: This is Stu

Hinnefeld of DCAS.

I joined a little late. So, I didn't introduce myself at the beginning.

But we should be able to do that. We do try to maintain open lines of communications with petitioners on all our petitions. I don't see this as being outside of those lines of communications. So, unless my lawyers advise me differently, I think we can pursue that.

But, to Mark's point, though, typically, a FOIA request in many cases results in very, very many documents being delivered. And so, if petitioners could identify to us the specific ones that they feel show the presence of thorium prior to `63, that would help us and facilitate that discussion quite a lot.

MEMBER LEMEN: Could I ask -- and again, I don't know if this is appropriate because I haven't been on the Board that long.

Ted will tell me if it is not, I'm sure, or one of the lawyers.

But could I ask NIOSH to initiate that discussion with the petitioners?

MR. ROLFES: This is Mark Rolfes.

We would have to have the document available first before we could discuss it, I guess.

MEMBER LEMEN: No, but, I mean, couldn't you pick up the phone and talk to the petitioner?

MR. ROLFES: Oh, sure, definitely, we can.

MEMBER LEMEN: And try to identify the documents. And then, you could pull the documents and look at them, and then you could get back together and discuss what the petitioners are talking about?

MR. ROLFES: Oh, definitely. I would be happy --

MEMBER LEMEN: So that we

eliminate all the red tape of going through an FOI again and all that kind of stuff.

MR. ROLFES: Yes, definitely.

What amount of time would be reasonable for you to take a look, Tina, for me to contact you?

MS. TRIPLETT: I mean, I have it in front of me. So, I don't know how to get it to you.

MR. ROLFES: Well, I would be happy to give you a call after this conference call is over.

MS. TRIPLETT: Okay.

MEMBER RICHARDSON: This is David Richardson.

So, one of the issues that you have brought up, because we have discussed this issue earlier in the call, is the distinction you are making between thorium on site and thorium-232, is that right?

MR. ROLFES: The issue that was

identified in this ORAU team document, I can read over my response. I am not sure if you have seen this, Dr. Richardson. But this might not be so clarifying, but I will go ahead and read my email to Brad Clawson here.

It says, "At the Advisory Board meeting in Tampa, you had mentioned finding documentation of thorium processing operations at the Weldon Spring plant from 1958 through 1966. The two documents which were embedded in the attached PDF" -- in my email -- "which have information regarding thorium operations during this time period were produced by ORAU in 1991 and 1998.

"These documents included information on all thorium operations conducted at both Mallinckrodt as well as the Weldon Spring plant, and don't clearly delineate differences between thorium-230 and thorium-232."

I identified that he was correct

that thorium operations occurred at the Weldon Spring plant from 1958 through 1966, and that NIOSH was also aware of this.

"The operations during this time period in its entirety, 1958 through 1966, in the context of the two ORAU references, were related to thorium-230 operations, operations involving the dissolution and chemical separation of uranium from uranium ore concentrates which contained primarily thorium-230 and other uranium decay chain progeny.

"NIOSH has information regarding the potential exposures to thorium-230 and other ore concentrate radionuclides in the Site Profile for Weldon Spring and, also, in Special Exposure Cohort Petition Evaluation Report and other White Papers specific to the Weldon Spring plant.

"On the other hand, thorium-232 production operations were conducted at the

Weldon Spring plant only during the 1963-through-1966 time period on an intermittent, campaign-driven schedule. Potential exposures to thorium-232 at Weldon Spring plant are discussed in the Weldon Spring plant Site Profile, the SEC Petition Evaluation Report, and in White Papers for the Weldon Spring plant as well."

So, that was my summary attempt to try to delineate the differences between thorium operations of, you know, operations involving the extraction of thorium-230 from ore concentrates and the production of thorium-232 on a campaign-driven basis in the later years.

MEMBER LEMEN: This is Dick Lemen again.

Dave, do you have more comments or questions?

MEMBER RICHARDSON: No.

MEMBER LEMEN: It looks to me --

and if I am misstating this, please correct me; I am sure you will, anyhow -- but it seems like, with this last discussion, we have just had another rock put in the middle of the road as far as coming to some conclusion on Weldon Spring. Is that the reading the rest of you are getting?

(No response.)

Hearing no comment, I guess that must be true.

I suppose what we need to do is get a report back from NIOSH after they have talked to the petitioners about this time period before 1963 that is in question, before we can make a further recommendation to the Board. Is that something you agree with, Dave?

MEMBER RICHARDSON: I mean, I think that sounds useful, just to be diligent, making sure that these concerns are addressed.

MEMBER LEMEN: So, with that in

mind, I think, Ted, that might be our report to the Board. We can talk to the Board about having resolved at least the questions in point one and two on the agenda. But I think we have to wait to present any final recommendation to the Board from the Working Group until we have this last rock removed from the road.

Is that in agreement with you, Dave?

MEMBER RICHARDSON: Sure.

MEMBER LEMEN: Ted?

MR. KATZ: I am sorry. This is Ted.

I managed to disconnect myself in the last minute. And so, I gather, the last I heard you were saying there is a rock in the road, and then I just heard you pick up with there is a rock in the road and you can't make a recommendation until we remove it.

MEMBER LEMEN: Basically, that is

correct. And the holdup on that would be for NIOSH to pick up the phone and talk to the petitioners and identify these documents that indicate the data gap on the missing material that they feel is there prior to 1963, and then for NIOSH to report back to the Working Group their findings on that. That is where I was going.

MR. KATZ: Okay. Thanks for that recap, Dick. I am sorry, but I just pressed the wrong button at the wrong time.

So, yes, you have a couple of options. I mean, Weldon Spring is on the agenda for the Board for this next meeting. It sounds to me like it is relatively quick work to have this conference -- I mean, I don't know what will come of it -- but relatively quick work to have this conference with the petitioners and sort out whatever discrepancy there is in their different understandings of what data are available.

So, I mean, I think you could ask Mark, or whoever is going to be presenting for NIOSH, to present at the Board meeting on the results of that discussion and whatever confusion has been sorted out from that.

It doesn't give an opportunity for the Work Group to meet again, but Weldon Spring was already on the Board's plate and was discussed at the last Board meeting as well. So, whether or not the Board wants you to return and have another Work Group meeting or not is unclear to me. It may be that it --

MEMBER LEMEN: This is Dick Lemen again.

I am not sure that is necessary. I think your idea, Ted, is a good one, for Mark to get this done before the California meeting and report to the full Board. I think, at least on my part, and I hope on Dave's part, that we could resolve this issue maybe at the Board meeting with this

additional information from Mark after the discussion.

Is that agreeable to you, Dave?

MEMBER RICHARDSON: Yes.

MEMBER LEMEN: It is agreeable to me, too, Ted. So, that is the way I would like to handle it.

MR. KATZ: That sounds good. That sounds efficient.

And then, the other thing is just, I mean, you and David haven't really opined on the first issue, the blunders issue, yet, but you have to decide whether you want to make a recommendation regarding closing out that issue, where you come down as a recommendation for the Board.

And sort of related to that, I think Ron Buchanan could sort of summarize. We have the latest SC&A response to the NIOSH response on that issue.

But it would be nice to have,

since we won't have a transcript at that time, it would be nice if Ron could just write up a final document sort of resolving the ambiguity that there was up until this meeting about that issue.

MEMBER LEMEN: All right. Maybe if that is done, Dave and I can talk and maybe we can talk -- I don't know when it is on the agenda, I don't remember, for the California Board meeting. Is it the first or second day?

MR. KATZ: Let me think.

MR. ROLFES: This is Mark again.

I believe it is the second day.

MR. KATZ: Yes, I think that is right.

MEMBER LEMEN: If it is the second day, maybe Mike and Dave and I can have a few minutes to just discuss this before, and we could make a presentation, then, at the second day to the Board and maybe get Weldon Spring included.

MR. KATZ: Yes, you certainly can talk and present at the Work Group meeting. Would you like Ron to write up a little sort of summary of at least the technical resolution of the blunders questions?

MEMBER LEMEN: Yes.

MR. KATZ: Okay.

MEMBER LEMEN: And I would like him to, then, circulate that to me, Mike, and Dave, if he could.

MR. KATZ: Yes, well, I will actually circulate that to the whole Board because they will have these other documents that have come in most recently as well to look at, or the last document from SC&A at least.

MEMBER LEMEN: All right.

MR. KATZ: Yes.

MEMBER LEMEN: Are there any comments, further comments or final comments, from the petitioners?

MS. JOHNSON: You know, there was one other item that came up at the last Board meeting.

Sorry. This is Karen Johnson again.

And it had to do with lack of worker data for, I think it was monitoring data, for the first few operating years at Weldon. Am I right about that?

MEMBER LEMEN: I don't know the answer to that.

DR. BUCHANAN: This is Ron Buchanan, SC&A.

And I think what you are referring to is we did that limited initial data completeness-and-accuracy test last summer. We found that the overall badging and bioassay rate was around 90 to 94-5 percent, but that there was no badging in `67, of course, and when the plant was closed down, and that the years 1958 and 1959 were not as high as their

averages. It was more like -- I don't recall -- I think maybe 60 or 70 percent rather than 95 percent.

MS. JOHNSON: Okay. Thank you.

MEMBER LEMEN: All right. Any other comments, Karen or Tina?

MS. JOHNSON: I think that's it for me for now.

MEMBER LEMEN: Any other petitioners on the line?

(No response.)

If not, I think where we stand is that Ron is going to summarize what we discussed on issue one. I guess, as far as issue two, do you want to add that in your summary or do you want to keep that separate?

DR. BUCHANAN: Well, are you speaking to me, to Ron?

MEMBER LEMEN: Yes, and I was wondering if maybe Mark Rolfes could just give you that information and you could throw it

into your report.

DR. BUCHANAN: Well --

MEMBER LEMEN: Or do you think that is two separate issues that should be done separately?

DR. BUCHANAN: Yes, I think it is two separate issues. I would like to get this out, so the Board would have it before the meeting.

If Mark would call Tina and get that document, look at that, and then provide a response to the Work Group, I think that would work best.

MEMBER LEMEN: All right. That will be fine.

Are there any other comments? I think we have an action plan and a path to follow. Any other comments by you, Dave, or --

MEMBER RICHARDSON: No.

MEMBER LEMEN: Okay. Anything

further from SC&A?

DR. BUCHANAN: I don't.

MR. STIVER: Nothing here. This is Stiver.

MEMBER LEMEN: Anything further from NIOSH?

MR. ROLFES: I don't believe so, Dr. Lemen.

MEMBER LEMEN: Okay. Ted, I will turn it back to you because I think we have concluded this Working Group meeting. I will let you finish it up.

MR. KATZ: Well, I would just like to say to everyone, the petitioners, the staff, everyone, Board Members. I think this was a productive meeting.

And, Dick, you get the pleasure of adjourning it.

MEMBER LEMEN: What?

MR. KATZ: We are adjourned.

MEMBER LEMEN: Oh, okay. Thank

you.

MR. KATZ: Thank you.

(Whereupon, at 11:24 a.m., the meeting was adjourned.)