US Department of Health and Human Services
Centers for Disease Control
National Institute for Occupational Safety and Health
Advisory Board on Radiation and Worker Health
139th Meeting
Thursday, April 15, 2021

The meeting convened at 1:00 p.m., Eastern Time, via Videoconference, Rashaun Roberts, presiding.

Members Present:

Henry Anderson, Member
Josie Beach, Member
Bradley P. Clawson, Member
R. William Field, Member
David Kotelchuck, Member
James E. Lockey, Member
David B. Richardson, Member
Genevieve S. Roessler, Member
Phillip Schofield, Member
Loretta R. Valerio, Member
Paul L. Ziemer, Member

Also Present:

Rashaun Roberts, Designated Federal Official
Nancy Adams, NIOSH Contractor
Bob Barton, SC&A
Zaida Burgos, NIOSH Contractor
Grady Calhoun, DCAS
John Cardarelli, DCAS
Josh Fester
Joe Fitzgerald, SC&A
Rose Gogliotti, SC&A
Warren Johnson
Josh Kinman, DCAS
Greg Lewis, DOE
Jenny Naylor, HHS
Chuck Nelson, DCAS
Lavon Rutherford, DCAS
Tim Taulbee, DCAS

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Proceedings

(1:00 p.m.)

Welcome

Dr. Roberts: So, anyway, welcome everyone. I'm Rashaun Roberts. I'm the DFO, Designated Federal Official, for the Advisory Board on Radiation and Worker Health.

You are here at the second final half day of our Board Meeting 139. Like yesterday, I'll just go over the typical preliminary.

If you are just participating by telephone, all the materials for today the agenda, the presentations, the background documents, et cetera, are all posted on the NIOSH website under scheduled meetings for April 2021. You can go there and pull up the presentations and follow along as you're listening. All of the materials that were posted were provided to the Board Members and other staff prior to this meeting.

If you take a look at the website, and also if you pull up the agenda for today, there is a Zoom link which will enable you to hear, to also speak and also to watch the presentations through Zoom. If you happen to be on Zoom, you do want to make sure periodically that you are muted if you're not speaking. The mute button for Zoom is located near the bottom left-hand corner of your screen.

If you are on a telephone line, please mute your phones unless, of course, you're speaking. If you don't have the mute button press *6 to mute. If you need to take yourself off just press *6 again.

And also, if you are on the telephone, because we are unable to see you on Zoom, if you could identify yourself before any questions or comments that you might have. And I do see that there is a telephone line ending in 222 that appears not to be muted on Zoom. So, if you could go ahead and mute.

Yeah, extension 222, well, the ending number -- there you go. Thank you so much.

So, with that important business squared away, let's just go ahead and roll right into our roll call starting with Board Members in alphabetical order. So, that would be you, Andy.

(Roll call.)

Dr. Roberts: So, thank you and welcome to everyone. And I -- actually let me reiterate. I did say this yesterday, but I will repeat it again, that there are no conflicts of interest for the Board Members today with any of the agenda items.

So, welcome everyone. Let's prepare to go further into the agenda. Again, you just want to make sure you're on mute on Zoom or by telephones, *6 if you're by telephone to mute, *6 to take yourself off mute.

So, I mentioned earlier that there was a bit of a twist from yesterday that we can thank for our technology for creating. Apparently during the public comment session there was a person, Dr. Dan McKeel, who had prepared comments for the Board and was on last night, but was unable to deliver those comments to the Board because he was unable to make himself heard through the technology.

So, I would like to see if Dr. McKeel is online or on the telephone at this point. And because, through no fault of his own, he was unable to make his comments, I just want to carve out a little time, since we are ahead of schedule anyway, to let him go ahead. And, if not, I can read the comments.

Mr. McKeel or Dr. McKeel, are you on?

Member Ziemer: I'm wondering if it's -- is it Dr. McKeel, maybe, not McNeil?

Dr. Roberts: Yeah, Dr. McKeel.

Member Ziemer: McKeel, yes.

Dr. Roberts: McKeel, I must be mispronouncing that. Yes, Dr. Daniel McKeel, Jr.

Okay. Well, I don't hear him. Hopefully, he's not on here and having the same difficulty. I did resend him the connection information today. But I will go ahead, since I don't hear him to go -- I will go ahead and read the letter.

So, hello, I am Daniel W. McKeel, Jr., MD and currently serve as the SEC co-petitioner for General Steel Industries, GSI, and Dow Madison AWE sites in Illinois, and for Texas City Chemicals, a Texas AWE site.

My main purpose today is to bring new information never before brought to the attention of the ABRWH, to the best of my knowledge, before this Board. The main subject is new information that supports a long-held assertion by 14 affiant Dow Madison workers and the SEC-0079 petition team that truckloads of magnesium-thorium alloy metal sheets and plates were shipped from Illinois Dow plant to Rocky Flats Plant, RFP, in Golden, Colorado.

RFP has two SECs, numbers 30 and 192. As background the ABRWH Number 16 meeting in Naperville, Illinois on March 22nd and 23rd, 2017 transcripts are most relevant in this regard.

The 3/22/17 transcript during the public comment period on March 22nd, I had Ted Katz, Board DFO, read my comment into the official transcript record, see pages 216 to 221. I am the -- something was redacted -- MD presenter identified on page 216.

I also forwarded to NIOSH and the Board through Mr. Katz additional summary information titled Mag-Thor Alloy Use at DOE Rocky Flats plant dated March 21st, 2017 consisting of six pages and seven exhibits.

This document contained explicit information that

proved Dow Madison Illinois site mag-thor alloy metal was used by RFP workers in Building 440 to shield DOE ATMX rail cars and secure semi-trailer trucks. An anonymous and three named Building 440 RFP workers confirmed they machined mag-thor alloy metal and named ten other living RFP workers who could verify their accounts with information about shipping manifests, work orders, and inventory of these metal plates. I encouraged interviews of these RFP source people.

The 3/24/17 transcript. The following day Board RFP Work Group Chairman David Kotelchuck reviewed the use of mag-thor alloy at RFP and summarized why NIOSH and the Board had concluded there was essentially no evidence to back up the 14 Dow Madison Site SEC-0057 affiant workers who testified that Dow Madison did, in fact, ship copious amounts of magnesium-thorium alloy to RFP, and in turn recycled mag-thor scrap for RFP shipped back to the Madison, Illinois site.

The purported 400 boxes of RFP data at LANL were also discussed. The new information was brought to my attention by a Dow Madison site expert. It recites a website as a 9-page document that was fully titled The Thorium Encyclopedia, the link as follows.

I won't read the link, and I'll just circulate this document after this Board meeting so that you can see it.

Page 3 of 9 includes at least 12 new pieces of information that specifically identified the new uses for Dow Madison mag-thor alloy in DOE-modified for security ATMX railcars. I will read page 3 of 9 into the record information that was new to me on January 24th, 2021.

Okay. So, let me read through that page. Okay.

Another example of mag-thor's broad utility was in the ATMX 500 and 600 series armored railcars. The

mag-thor used on Union Carbide's special 500 and 600 series railcar carriage plates were produced exclusively by Dow Chemical at their Madison, Illinois plant.

These series of railcars were used to transport nuclear weapons, mag-thor turnings intended for recycling, spent solid, and liquid nuclear waste, and other manufactured raw and processed uranium-thorium, their respective salts and oxides, and other interim materials to and from Rocky Flats and other facilities. Structural and floor and wheel panel components for the ATMX 500 and 600 rail cars were specifically reinforced using mag-thor, though not to contain a nuclear explosion.

In addition, specially fitted Fruehauf semi-tractor trailers using the HK31 and HM21 type alloy, see Table 1, were created for terrestrial hauls. Dow supplied almost all of the mag-thor alloy including HK31A, HM21A, HM31A, HZ32, HZ32A and ZH62A, see Table 1, used by the military from 1957 to 1960, with approximately 64 metric tons of pure thorium coming from Canada. The balance, 16 metric tons, coming from Dow plants in the U.S.

Dow Madison continued to produce thorium alloys at their Illinois plant and to a lesser extent the Dow Bay City in Midland, Michigan plant until as late as 1992. Materials and equipment transferred to the Rocky Flats weapons production facility over the ensuing decades was seamless, given that Dow Chemical managed Rocky Flats from 1952 to 1974, much of this processing was performed in Building 440 at the Rocky Flats campus.

From time to time, the Mallinckrodt Chemical Company was given permission by Dow to operate at Rocky Flats.

So, that's the end of that page.

Pages 6 through 9 of this document contain references, two of which refer to the same paper I

co-authored.

And there's a link where you can access the paper.

Interestingly, our paper was not the source of any of the new facts. This week I will transmit to the Designated Federal Official my March 4th, 2021 ABRWH public comment and relevant portion of the ABRWH Meeting Number 116 public comment and related documents for your review and further consideration and appropriate action. Thank you. Daniel W. McKeel, Jr., MD. And it's dated 4/14/2021.

Okay. So, hopefully I did that justice. Some of the terminologies are little bit new to me but --

Member Kotelchuck: And Dave, I'm the Chair of the Rocky Flats Working Group. So, you'll send it to all, but I will take -- I will -- certainly, this is new information, and we'll certainly look at it decide how to go further with the working group.

Dr. Roberts: Okay. Will do and again, either today or tomorrow I will send that forward to the Board.

Okay. So, with that -- Paul, were you saying something?

Member Ziemer: Just very quickly. I wonder of the Dow Madison site needs to take a look at that a well, not just Rocky Flats? I think that Dr. McKeel particularly has an interest in pursuing the Dow Madison issues. If I understand it correctly.

Josie?

Member Beach: Yeah, Paul, I was going to say the exact same thing, that our work group should look at it also.

Member Ziemer: Yes.

Mr. Rutherford: This is Lavon. I want to also -- as soon as we get the information, we can pass that

information on to the Department of Labor for their consideration if covered employment should be considered.

Dr. Roberts: Okay, very good.

Member Ziemer: Yeah, I think the -- I think before the work groups do anything, we need to have NIOSH look at this, and if there's further evaluation to be done that should be done probably before the work groups get involved.

Member Kotelchuck: Yes.

Dr. Roberts: Yes, okay. And, yes, okay, so, NIOSH will be included, of course, in that dissemination, as per usual, and then we will go from there.

Okay. So, we are a few minutes behind for Mr. Chuck Nelson's presentation on the SEC petition status update, but I'd like to invite him at this point to do his presentation. Chuck?

SEC Petitions Status Update

Mr. Nelson: Thank you, Rashaun, I will attempt to share my screen here. Let's see. Can you all see that?

Dr. Roberts: Yes.

Mr. Nelson: Okay. My name is Chuck Nelson. I'll be doing the SEC update for today. Okay.

We do this update at every Advisory Board meeting to give the Board an indication of the petitions and qualifications and their evaluation. In addition, this update provides the evaluations currently under review with the Advisory Board, as well as any working 83.14s.

This update can help the Advisory Board prepare for future work group meetings, as well as any upcoming Advisory Board meetings.

To date we have had 258 petition submittals. We

currently have no petitions that are in the qualification process. We do, however, have one new petition evaluation in process, which is for Pinellas, and we will discuss that a little bit in the next slide.

Currently, we have 12 reports that are under review and with the Advisory Board.

Okay. So, the Pinellas Plant, that's the newest SEC petition currently under evaluation, it's for the time period of 1957 through 1990, and this is SEC-0256 and it's being evaluated for all employees during that timeframe. The expected completion of the evaluation report is late 2021. I think we talked about that a little bit yesterday. And with that we would be targeting a presentation of the evaluation report at the Advisory Board meeting in August 2021. That would be a full Board meeting.

Okay. Next, we have Lawrence Livermore National Lab. It's for the time period of 1990 to 2014. It's SEC Petition 0221. This was a reserve period in the previous evaluation report. So, this would be an addendum. Some of you may remember that the expected completion date for this one has moved out a number of times. We've made some attempts to get on-site to address some issues that we still are currently working on, but with the ongoing Covid-19 pandemic we have not been able to get on the site.

We have received a pretty good cache of records that were currently going through, that came in some time in February, quite a few records, in fact.

Okay. Next is the Y-12 plant, which is SEC-0250. The time period for this is 1987 through 1994. This time period was previously reserved. So, NIOSH is now completing an addendum for this time period. The addendum expected completion date is hoped to be July 2021.

Okay. Other petitions under review with the Advisory Board. Okay. It says Hanford SEC-0256 that's not correct. It was a typo that I did not catch until reviewing this recently. So, that's Hanford SEC-0057. All the SEC issues are closed except those related to the ongoing co-exposure modeling effort. That's progressing well and expected to be done in late 2022.

Next is Savannah River Site, SEC-0103. And I'm sure everybody is aware that we are going to be talking about that following this presentation.

Next, Los Alamos National Lab, LANL, SEC-0109, NIOSH is working to resolve issues raised by SC&A in a working group.

We have Sandia National Lab, that's SEC-0188, NIOSH is currently working on completing our response to SC&A's review of the Addendum 2 from Sandia National Lab, Albuquerque, and we hope to be getting that to you by the end of May.

Okay. Next Idaho National Lab is SEC-0219. NIOSH is working to resolve issues raised by SC&A in a working group. The were some issues with REAC reviews and OTIB-0054 and responding to some working group and SC&A issues on the burial grounds.

Next Argonne National Lab - West, SEC-0224. NIOSH is working to resolve issues raised by SC&A in a working group, specifically they are looking at Report 97, which is BZ to GA, breathing zone general area air samples and how to relate those. And that'll feed into a specific report for ANL West, will be report 89.

Okay. Next is Area IV, Santa Susanna, SEC-0235. We are waiting for records to be released from EMCBC. That's a records center here in Cincinnati and we are also working on a response paper related to some petitioner supplied materials.

And we have Metals and Controls SEC-0236. It says right there an update scheduled for today's meeting. You know, in our effort to try to get these presentations out earlier, earlier to the Advisory Board and everybody and posted to the web sometimes we have some things in there that were on like draft agendas that may come off and that's the artifact of that. So, Josie did talk about this some yesterday.

Okay. A De Soto Avenue Facility SEC-0246. NIOSH is working to provide clarification on a few remaining issues and, again, we are waiting for records to be released from a Record Center here in Cincinnati.

And that brings us down to Reduction Pilot Plant SEC-0253. Again, that's an artifact of providing this early and getting it out on the web, but this was talked a little bit about yesterday. SC&A and the Advisory Board work group, specifically SC&A, completed their evaluation of our evaluation report and so we have that on our side, and I believe there was some discussion yesterday about moving the remaining issues into another established work group. So, that is the update on that one.

Okay. Brings us down to sites currently under Advisory Board review awaiting action, and for this it's a list of the applicable time periods for each of the sites. One thing I'll have to make a correction of, and which Brad Clawson brought up during the December Advisory Board meeting which I did not catch until shortly ago. The Savannah River time period is '72, not '73, through 2007.

So, if you want to look down through each of those sites and for the Savannah River, Los Alamos, Sandia Idaho, Lawrence Livermore, Argon National Lab West, Area for Santa Susana, Metals and Controls, De Soto, Y-12, Reduction Pilot Plant, you'll see the years under review.

Finally -- I think I got out of order there or skipped

some things. Okay.

Finally, potential 83.14s, these are NIOSH-initiated SEC petitions. We have West Valley Demonstration Project. And SEC has already -- an SEC Class has already been previously addressed, but at this time we are evaluating the time period from 1966 to 1968. We are still in the evaluation process and we still have a large number of documents that we received from a data capture, and we've not completed going through those yet. So, this review is still ongoing.

And that is it for the SEC updates, if there are any questions.

Member Beach: I was going to say good job, Chuck. All the things I wrote down you corrected already. So --

Mr. Nelson: Okay. Thank you, Josie.

Dr. Roberts: Okay. Any other questions for Chuck, or comments?

Savannah River Site SEC Petition 103

Okay, great. So, we are right at about 1:30 to set up this next agenda item. As you can see that item is the Savannah River Site, SEC-Petition 103 and you'll note that the remainder of today's session is devoted to that agenda item.

The agenda allows for presentations from the SRS Work Group, NIOSH, SC&A, and also the Petitioners will be welcome to present as well. And I believe there was a Petitioner yesterday who stated his intent to present.

Now, we did start to address the SRS Petition our last Board meeting in December and we had tabled -- we had tabled the discussion. So, we do need to untable the agenda item before we start with the presentation. So, to start out, we need a motion from a Board Member to untable the agenda item.

Member Beach: Rashaun, this is Josie. I'll make that motion to untable.

Dr. Roberts: Okay. And I need a second.

Member Clawson: I can second it.

Dr. Roberts: Okay, Brad, you say you'll second?

Member Clawson: Yes.

Dr. Roberts: Okay -- I'm sorry?

Member Ziemer: Could you read the motion that I coming before us now?

Dr. Roberts: Sure. We are untabling the Savannah River Site discussions of the Savannah River Petition 103.

Member Ziemer: What is the motion?

Dr. Roberts: The petition.

Member Ziemer: What is the motion that we are taking off the table. There is a specific motion that --

Member Clawson: It's the SEC, Paul.

Dr. Roberts: Right. So, back in December we tabled the discussion. The discussions were really -- were not complete. So, I'm just -- this is a motion to untable it so that we can move into the agenda item.

Member Ziemer: I'm sorry. Did we table a motion, or did we table discussions?

Dr. Roberts: We tabled -- I'm sorry. We tabled the agenda item, so we are trying to untable it so that we can resume the business.

(Simultaneous speaking.)

Member Ziemer: Well, I don't think you table agenda items and it's -- well, okay, go ahead, that's

fine.

Member Beach: That's not correct. There was a motion on the table as an SEC for Savannah River and we tabled that during the discussion because we ran out of time. So, there was a motion on the floor that we tabled. And I don't have it in front of me.

Member Ziemer: That was my thought too, because tabling is done on motions.

Member Beach: Yeah, there was a motion and I believe it was read, I think Brad sent that around several months ago.

Member Clawson: Correct.

Dr. Roberts: Okay. Well, then how about this. Since -- Brad, since you had the language for it can you do the -- let's just start this over so that we can get into the presentation.

Member Clawson: Yes. What we have is a proposed class action which was all construction issues of the Department of Energy subcontractors, excluding employees of the following contractors, who worked at the Savannah River Site in Aiken, South Carolina. During the specific time period --

Dr. Roberts: So, Brad, can you stop for a second? I can't hardly hear you, and I don't know if it's interference from other people, but -- I'm having a hard time.

Member Valerio: There's a lot of static out there.

Member Clawson: There's a couple of people that are not muted.

Member Ziemer: There's an echo of some sort.

Member Clawson: Okay. Is that better? Okay. By your muted face, Paul, I can see you said yes. Okay. I'll start over.

What we had is a proposed Class Definition, all construction trade employees of the Department of Energy subcontractor, excluding employees of following prime contractors who worked at Savannah River in Aiken, South Carolina during the specific time period, i.e., DuPont de Nemours and other companies October 1st, 1972 through March 31st, 1989, and Westinghouse Savannah River April 1st, 1989 through December 1st, 1990, who worked at the Savannah River Site from October 1972 through December 30th, 1990 for a number of days aggregated at least 250 days occurred either solely under this employment or in combination with other work days within the parameter established for one or more other Classes of employees, including the Special Exposure Cohort.

That's what we were discussing, Paul, and that's what we are taking back off the table. And now we are opening it up for more discussion.

And I'm still hearing a little bit of feedback.

Dr. Roberts: So, okay, so anyway let's --

Member Clawson: You have a real echo, it's hard to hear you.

Member Beach: Everybody is echoing. Somebody needs to mute.

Member Lockey: Let's everybody mute, let's see if that takes care of it.

Dr. Roberts: Okay. Can people hear better now?

Member Beach: Yes.

Dr. Roberts: Okay. So, you know, maybe there is a little bit of confusion about this, but I'm thinking, you know, we can go ahead -- so, he's read the motion. That was -- I'm wondering if that's a little bit premature, if we should do the presentations -- should have been doing the presentations first, because I thought the discussion --

Member Clawson: Well, you've got to understand what Paul was trying to tell you, is we have this motion on, it was tabled. We are just refreshing the portion of what the motion was. And then we are going in and let NIOSH and SC&A do their presentations, if that's okay.

Dr. Roberts: Okay. Yes, that will work.

Member Clawson: And it sounds like I'm echoing right back -- I may go get another headset and put on here, but that being said, Tim, are you going to present or John going to present for NIOSH?

Dr. Taulbee: I'm going to present.

Member Clawson: Okay, well, I'll turn that over to you and I'll go try to get another headset to straighten stuff out.

Dr. Taulbee: Alright. Thank you very much, and give me just a second here to share my screen.

Okay. Can everybody see my screen?

Member Beach: Yes.

Dr. Taulbee: Thank you. Alright. Well, thank you, Mr. Clawson. And the purpose of this presentation is really just to give a summary and an overview. If you recall back in December, I gave a very lengthy presentation. And so, this one is to just touch on some of the key items and to try and clear up some of the issues that seemed to cause some confusion during our March work group meeting.

So, before I get going, I do want the recognize my colleague John Cardarelli, he helped me pull all this together, as well as the ORAU team led by Mike Mahathy. They've done a fantastic job of helping us throughout this. So, thank you all.

Alright. Let's see if I can advance here. Okay. Well, I first wanted to go over the two key dose reconstruction documents for unmonitored

subcontractor construction trades workers at the Savannah River Site. And the first one is DCAS-IG-006. And this is the criteria for the evaluation and use of co-exposure data sets.

And within this presentation, if you've pulled it up from the web, if you click on these blue underlined components, that will take you to the document that I'm referring to here. These are hyperlinks, and so you can open them up directly.

There's been a lot of discussion about completeness for the co-exposure data sets. And so, I wanted to point out what it is that DCAS-IG-006 actually says about completeness. And to read this into the record. What it states is: to determine if there's sufficient measurements to ensure that the data are either bounding or representative of the exposure potential for each job exposure category at the facility.

It goes on to indicate that the evaluation for completeness should consider temporal gaps in the data, and it provides an example with respect to the completeness from the Nevada Test Site. And if you recall from that example that I went over in December, it gave an example of radiation safety personnel were the only ones who were monitored for internal exposure to plutonium during certain time periods, and in latter time periods it was both the rad safety folks and the security personnel. But construction trades workers were not at the Nevada Test Site during those time periods. We don't have that situation here at Savannah River, when you go through all of these documents.

So, in the context of completeness, that is the context of it. One thing to keep in mind is when we talk about completeness and we talk about percentages that might be brought up, if we had a 100 percent of people being monitored there wouldn't be a need for a co-exposure model; a 100 percent of the people who were exposed.

So, were not going to have 100 percent monitoring along those lines. Our context of completeness deals with, are all of the job exposure -- are all of the jobs covered, do they have monitoring in each of the time periods, and do we have any gaps, and do we have evidence that the highest exposures are present in this dataset?

This is all outlined in OTIB-0081 that we have it for the Savannah River Site. This is the internal dosimetry co-exposure data for Savannah River. There are nine radionuclide co-exposure models: nine for construction trades workers, and nine for non-construction trades workers. This is the document that is actually used in dose reconstruction for the Savannah River Site, whether you're a construction trades worker or non-construction trades worker. Okay? That document contains the actual models.

Next, I want to talk a little bit about job-specific, and I've got versus routine bioassay samples, but it really should be and routine bioassay samples. And this is a direct quote out of a Savannah River document: the purpose of the job-specific bioassay sampling program is to collect bioassay samples from workers whose routing bioassay program does not include some or all the radionuclides present at the work site, or who are not on a routine program.

Okay? So, the job-specific bioassay program is really a supplemental to the routine monitoring program. It's not a separate program in and of itself, it is a supplemental. If you're not on a particular routing bioassay, you're signing into an RWP and that states you need to be monitored for a particular radionuclide. Then you are to leave the job-specific bioassay.

Most of the workers, including the subcontractor construction trades workers at Savannah River, were on a routine bioassay schedule. In 1997, there was a DOE Notice of Violation, and this was a procedural violation, and it indicated that only 21

percent compliance -- that there was only 21 percent compliance of submitting job-specific bioassay.

When you go through the numbers, that meant that only 68 of 324 workers submitted their job-specific bioassays as they were supposed to. The workers who did not submit job-specific bioassay, the remaining 79 percent, or 256 of the 324 workers, were followed up and none -- and there was no indication of an internal exposure of those people.

So, this was a violation. They did follow up after they -- this was identified, and these 256 workers left bioassay, and nobody had an indication of an exposure. This is due to the defense and depth that the Savannah River Site had of engineering controls, air monitoring going on in the workplace, personal protective, respiratory protection, contamination surveys, and then the bioassay is that last line of defense that we have talked about in the past.

It's important to note that at Savannah River in 1997, when this violation came up, there were over 6,000 routine non-tritium bioassays. This indicates that the job-specific bioassay program comprises a relatively small fraction of the overall internal monitoring program, and likely has an insignificant impact to the co-exposure models that we developed.

Now, we couldn't address this latter component precisely back a few years ago when this was first brought up before the Board. This led to the evaluation of the RWPs. Okay? It was this ability -- because it was postulated that subcontractor construction trades workers may more preferentially be monitored via job-specific bioassay versus routine.

So, the goal was to look at RWPs, look at construction trades workers who signed in on the RWPs, and were they monitored, yes or no. Okay?

So, that was the goal of Report 92 and we were to look across the entire site, all the different areas, over the entire time period from 1972 through 1997.

Okay? And during that, one other thing that SC&A had indicated that they wanted to see some proof or evidence of, is the workers who were not monitored. Were they physically working on the same RWP with a monitored worker? And Report 92 goes through that in great detail, of looking at individual RWPs and when somebody was not monitored, was there a monitored worker on that RWP? And we went through and we were able to demonstrate that that was the case.

When you go through Report 92 you'll see monitored, directly monitored, and effective monitoring. That effective monitoring column in each of those tables is the combination of the directly monitored workers, and then the paired unmonitored workers, and you'll see that the percentage monitoring jumps into the 90-percentile type range. So, those workers that were not monitored, whether it was via job-specific or routine bioassay, whichever it was, they were paired with monitored workers.

When we did Report 92, we noted that we had data gaps. That we didn't have RWPs, we didn't have job plans prior to 1991 for all areas. Now, we did have them for one area, A Area. We were also able to look at incident monitoring in Report 92 to make sure that the highest exposed workers, those involved in incidents where things went wrong, were they actually monitored. And that's all in Report 92. And we found that, in fact, they were monitored.

So, we know the bounding data would be in the co-exposure monitor -- co-exposure data set. But due to these gaps and a concern for other areas, we looked at the NOCTS data as a whole, and this was Report 94, entitled Bioassay for Subcontractor Construction Trades Workers at Savannah River

From '72 To '97.

And what we were specifically looking for is, do we see any trends in the data or gaps in the data where, if you go back to that Nevada Test Site example where there are certain time periods where there was no monitoring for construction trades workers?

And with NOCTS we were able to look at specifically the subcontractors to make sure there weren't any gaps, and there were not when we went through this. And so, over this time period what we did find, much like in Report 92, there was a lower percentage of workers monitored in the 1970s, and in the 1980s that percentage of monitored workers increased, and in the 1990s it increased further.

One of the findings that SC&A had about Report 92 was that we weren't able to look across all of the areas; we could only look at A Area with respect to monitoring of subcontractors in the -- up through 1990.

In response to that finding, we went back to Plutonium bioassay logbooks and we analyzed, do we see monitoring across other areas, more Plutonium prevalent areas, such F and H area, and what we found was that there were 11,316 bioassay samples from 7,000 subcontractors between 1972 to 1990. And these are plutonium bioassay. So, what we found is the majority of those samples, and I presented a graph in December that showed the majority of the plutonium samples were from F and H area, the two main plutonium processing areas where you'd expect to find more monitoring. But we found that the subcontractors were, in fact, monitored more frequently in those area and so this further confirmed that there is monitoring data across other facilities, not just A Area.

Another issue that has been raised with regards to the co-exposure models, is our combination of what we'll call DuPont construction trades workers, and

subcontractor construction trades workers. In response to that back in 2019, we wrote a White Paper comparing those two groups, this would be for plutonium, and this was presented to the work group back in November. And what we found is that there's really no real difference between these two groups.

And what we found is when you look at and you carry through from TUPAS into the intake modeling for these two particular groups, we found the geometric mean for DuPont construction trades workers to be slightly greater than the subcontractor construction trades workers. When it got to the 95th percentile of those distributions, that the DuPont CTWs had a higher 95th percentile in the 1970s than subcontractor did in the 1980s. But as Dr. Ziemer pointed out, the numbers were really quite comparable.

And there was a question that was raised by Dr. Lockey about, did we do any bootstrap comparison to look at the uncertainty associated with those geometric means and the geometric standard deviations in the 95th percentiles, and we had not at that point. And so, what we decided to do is try and do an uncertainly analysis of these co-exposure models.

During this with plutonium is very difficult. It's not impossible, but very time consuming. Not something that we could do in just a couple of months. So, we did the analysis with tritium, because tritium was an easier radionuclide to do this with and provide the analysis to give some idea of what the uncertainty of across these bounds would, be geometric mean in the 95th percentile, and that's the subject of the 2021 bootstrap white paper.

Now, Dr. Anderson yesterday mentioned about doing the bootstrap analysis across other co-exposure models, and I just want to be clear: at this point we do not intend to do this at this time

across the board with other co-exposure models unless really requested by the Board. If this is something you feel we must do, then we can do it. But that is not something that we are preparing, or we are -- we have on or radar to do.

Developing these co-exposure models already takes a lot of time, and to do this would actually just extend that time.

The final white paper that I want to point you to, and again, you can get to all of these documents by clicking on the link, is the 2021 Practical Implications. What we found from this bootstrap analysis is, again, the DuPont CTWs in the 1970s appeared to have higher geometric mean than the subcontractor CTWs did, and the same with the 95th percentiles when you look at it across all the years.

However, when you compared that uncertainty from the bootstrap, they really overlap. So, there's really no practical difference between the DuPont and the subcontractor CTWs, even though in the latter years we had more subcontractor CTWs than we had DuPont in doing that comparison.

So, all of this forms our weight of evidence for our conclusion from the evaluations, the stratification and uncertainty analysis. We feel there's a robust of contractor CTW monitoring in the 1990s. We feel there's an acceptable subcontractor monitoring, more than half in the 1980s, from what we found during our evaluation. And there's limited monitoring in the 1970s for subcontractor CTWs, but our indications with tritium and plutonium when we dove into the detail more, that the DuPont CTWs would be bounding for these two groups.

We do not see any evidence where subcontractor construction trades workers were not monitored to a degree that would bias the current co-exposure models. So, based upon our weight of the evidence, we believe the co-exposure models are bounding

and representative of the exposures that would be received by an unmonitored subcontractor construction trades worker and, therefore, we conclude that dose reconstruction is feasible.

We hope that when you go through all of these documents and you look at the logic that we've laid out here and the presentations that are previously, we hope that you'll all come to that same conclusion.

And with that I'll be happy to answer any questions you may have, thank you.

Member Lockey: Tim, let me ask you a question. Jim Lockey, let me ask you about --

Dr. Taulbee: Jim, you went on mute. Sorry.

Member Lockey: I wanted to start my video again.

Let me ask you a question, Tim, about the practical indications of the bootstrap uncertainty analysis. Your last bullet point on this slide. If you had found that the tritium cohort, even though because there's overlaps in the geometric center of deviations there was no difference, but the trend line was opposite, the trend line for the tritium was substantially higher for the subcontractors than -- from the contractors, what would have been your thoughts on that?

Dr. Taulbee: Let me, I'm assuming you're talking about, I believe it's this type of slide of the --

Member Lockey: Yes.

Dr. Taulbee: Okay. If those two had been inverted, I would actually be much more considering of a SEC for the early time period up through 1980. And the reason that I would say that is due to this particular graph, of the number of workers in each of the groups. And here you are -- we are seeing that the DuPont CTWs out-number the monitoring for the subcontractor, but it's inverted in the 1980s. Okay.

Member Lockey: Alright.

Dr. Taulbee: But when you look at the two trends between the two, if the blue open squares here had been subcontractors, I would be quite concerned with that from the standpoint of we had less data and they were showing a higher exposure potential within this, but they are not. So, --

Member Lockey: That was my conclusion. If this would have been, if it would have shown that I would have had real heartaches with -- particularly before 1980, in relationship to whether your data related to subcontractors and contractors have similar data.

The other question I was going to ask you is when you're looking at tritium one of the things that we were thinking and I would logically think this also, that subcontractors may be put into job tasks that are more potentially hazardous. Does that not apply to tritium in what we are looking at here?

Dr. Taulbee: It does, and it doesn't. And let me answer this in two ways. A lot, there's a lot of misconception with regards to -- and I was actually guilty of using some imprecise terminology early on in these discussions a few years ago.

Savannah River had a zero-intake policy, with the exception of tritium, okay? And so, they didn't intentionally try to get anybody an internal exposure. When they would bring in outside workers for the, quote, hot jobs, in many cases it was because of the external potential that was there, not the internal potential. It was more from the standpoint of they're going to be around fresher fuel or more -- an area where they would get a higher external dose. And so, they would bring them in more from that standpoint where they could control it. Because DOE had set limits of, I believe at that time it was 3 rem per year that they had. And so, their operations folks could get burned out.

Now, burned out from an external standpoint, not an internal. They weren't purposely exposing anybody to internal. Everybody would be wearing respirators, when respiratory protection required. It was -- they were trying to protect and prevent any internal exposures.

Does that answer your question?

Member Lockey: I'm not sure. I guess what I was trying to get a handle on is: you know plutonium levels were -- plutonium levels for the contractors and subcontractors were more equal in comparison to tritium. So, why? I'm trying to figure out why. Why is that different? Is it because of the location the worked in?

Dr. Taulbee: Actually, I believe it has a lot more to do with the duration of exposure, in a sense. Subcontractor would be brought in for a shorter duration job; whereas the DuPont CTWs would be there for all year-type of scenarios. So, when you're tallying the final dose, the actual final dose would be less.

There is a lot of question as to whether their exposure would be higher over a shorter time period, and whether they're equivalent or not. And that was one of the reasons that we went to stratifying the datasets between routine operations and non-routine.

Now, within the DuPont CTWs, that's non-routine work that they are doing, that they are primarily exposed to, much like the subcontractor CTWs. So, an argument can be made that, you know, both the DuPont and the subcontractors are doing short-term work, and why they are significantly higher is -- my best guess is that they were doing more of it. They were just doing that work more frequently than a subcontractor coming in for a one-off job.

Member Lockey: Okay.

Member Anderson: Are the tritium and the plutonium exposures in the same work areas?

Dr. Taulbee: No. No, not at all.

Member Anderson: So, there would be -- it could be different people working in different areas?

Dr. Taulbee: And it absolutely is.

Member Anderson: But comparing them is not --

Dr. Taulbee: Well, it's showing the overall --

Member Anderson: The tritium population would appear to be different than the plutonium population, as far as exposures.

Dr. Taulbee: Yes, absolutely. The tritium exposures were in the reactor areas, as well as the tritium separations facilities. Whereas the plutonium is restricted to really the F and H B lines where plutonium was separated and the research in A Area.

Member Lockey: And the only reason that the tritium level and the subcontractors may be lower, they are working in the reactor areas where tritium is, is that they likely were short-term workers there in comparison to the -- in comparison to the prime contractors.

Dr. Taulbee: That's my best interpretation of it, yes, that they would be doing the same, same basic type of work. I can't -- I can certainly envision them doing the same type of work, you know, really side by side. We saw that on the RWPs. The timing is the only major difference that I -- that I really can see from that standpoint.

Member Lockey: And one other question --

Member Ziemer: Could I ask a question?

Member Lockey: Go ahead, Paul.

Member Ziemer: This is Ziemer. This is a -- I don't even know who to ask this question to. But I have always appreciated David Richardson's analysis of these kinds of data and so I think he's on the work group. But I haven't heard any of David's sort of valuations of the NIOSH information, or indeed of the SC&A. I don't know if David is on the call today, but I'm concerned that we haven't heard from David on these issues.

Member Richardson: Yeah, Paul, I'm on. I think there was a, there was a question, I didn't want to cut off Dr. Lockey.

Member Lockey: Well, David, you want me to go ahead?

Member Richardson: Sure.

Member Lockey: Okay. So, then --

Member Clawson: I've got an idea. You know, we've got two sides of this coin and we are playing with one side of it right now. Why don't we get, why don't we go through SC&A's and then we can compare because right now we are just looking at one side of this coin. Well, this would be my suggestion but it's up to you if you want to continue on with this. But I think we ought to deal with all of the information and then start to question it because we can sit here and nitpick back and forth and not come up with anything.

So, Jim, if it was alright with you, I'd like SC&A to be able to give their presentation and then I'd like to come back and open this up for discussion. If that would be alright with everybody.

Member Lockey: Brad, that's okay with me. I just -- it's easier for me to -- we'll have to bring back some slides then because --

Member Clawson: Well, and we may have to. But you know what, when we are sitting here looking at one side of this and we've got a whole another side

I understand too and that's why I take a lot of notes is because I want to be able to come back to these, but I want us to be all, dealing with all the information and not just part of it.

Member Richardson: Yeah, and I think you have to look at both sets and I have questions about both sets that I think that both sides need to come in and try to answer because some of this --

Member Lockey: Very much so, and I'm not trying to take it away from this time or anything else like that but I'm wanting us to deal with the whole issue and look at both sides of what we've got.

And so, with that being said and if it's okay with Rashaun and stuff, I'd like to be able to allow SC&A to be able to give their presentation, Joe, and we'll go from there.

Dr. Roberts: Brad, one thing I am concerned with is that there may be Board members that may have questions at this point. So, before we get into the SC&A presentation can we check in with some folks we haven't heard from and just see where they alright at with this information and then we can proceed.

Member Clawson: Sure.

Dr. Roberts: And if everybody is comfortable with just moving on. So, for instance, Gen or Bill, do you have any particular perspective at this point?

Member Beach: Rashaun, you can call -- oh, sorry. I was going to say I'm fine.

Member Field: This is Bill. I'm really, you know, everything has been said is very helpful so far and I see approaching it different ways. But like, Paul, I'm interested in what David's view is, but I'm also interested in the follow-up questions that Jim may have had as well. So, however you want to approach it I'm all in. But right now, I just sort of like store information since I wasn't on either of the

working groups that looked at this issue.

Member Roessler: Rashaun.

Dr. Roberts: Hi, Gen.

Member Roessler: Hi, I don't think it matters too much which direction we go as far as we get ample time to go back if we wish to ask some questions on the NIOSH presentation.

Dr. Roberts: Okay.

Member Field: And Rashaun, it seems like the feedback is when people are talking, and you're not muted. So, it seems like when you mute the feedback stops.

Dr. Roberts: Okay. Well, so it sounds like people - and Loretta, did you have a particular perspective?

Member Valerio: Can you hear me okay?

Dr. Roberts: Yeah.

Member Valerio: I think I want to listen to SC&A's presentation and then ask my questions.

Dr. Roberts: Okay. Well, then unless somebody opposes that, let's go ahead, Brad, with your recommendation to do the SC&A presentation.

Member Clawson: Thank you. Okay, Joe, I'll turn the time over to you.

Mr. Fitzgerald: Okay. Just wait for these slides to come up. First off, can everyone hear me?

Member Beach: Yes.

Mr. Fitzgerald: Am I coming through?

Member Beach: Yes, we sure can.

Mr. Fitzgerald: Okay. I just wanted to make sure. Good afternoon, this is Joe Fitzgerald, SC&A, and I will try to be brief as well so we can get back into a

discussion.

NIOSH just addressed the dose reconstruction feasibility question by emphasizing it has, as it has throughout, that there's considerable SRS routine bioassay data. Literally thousands of data points which includes subcontractor information. And that this data, given its amount and scope, would represent or bound whatever subcontractor job-specific bioassay data may be missing. With a, you know, as Tim just said with a conclusion that there would be little difference between the exposure potentials of each.

But the issue I think that's before us today, I wanted to simplify this because we've gone through so much in all the different discussions, but I want to simplify this.

The issue before us today is how can one make the comparison and reach the judgment that Tim is referring to if one of the two data sets that we are talking about is missing or indistinguishable from the other. And that's the subject of the slide that's up right now in terms of job-specific versus routine bioassays.

Now, Tim gave his perspective from the NIOSH standpoint I want to give you SC&A's. From SC&A's standpoint what bioassay may be missing is not of little significance. Okay. For an entire year, you know, as late as 1997, I just want to remind everybody, almost 80 percent, 80 percent of RWP required job-specific bioassays went uncollected. Okay. The Department of Energy at the time not only fined Westinghouse for this oversight, but also fined them for the repetitive nature of the problem going back in time and for the fact that corrective actions that they were required, and this is again the contractor was required to take, were unsuccessful.

So, I want to emphasize this was a, clearly an

embedded safety culture issue. Okay. one that remained persistent at Savannah River and implicated how Savannah River managed its bioassay monitoring. So, you can talk about defense in depth, but here is a circumstance as late as the mid-90s where you had a major shortcoming in an important monitoring program.

And while, in 1997 as Tim just pointed out, this may have only involved 324 workers at Savannah River no one has any idea of how many are implicated in many of the earlier years at Savannah River that we are talking about in terms of this SEC and what internal exposures may have occurred in those years. Okay.

I think and we have made this pretty clear that we are left to pretty much speculate or assume on that very specific question it cannot be determined. You have to, you have to do a reach in terms of extrapolating what you do know.

Keep in mind that job-specific bioassays were ordered for work involving non-routine, non-routine radionuclide sources ones not covered by the routine bioassay program as Tim pointed out. And transient subcontractors figured in such RWPs, job-specific bioassays.

So, NIOSH needs to establish, as IG-006 calls for, to show or to demonstrate as stipulated by these guidelines that this routine exposure data can represent or bound these non-routine bioassay samples that were taken over 25 years. This is 1972 to 1996 when the enforcement action took place and Westinghouse Savannah River revamped its entire program.

But -- and this is the crux of what we have concluded -- NIOSH has been unable to locate and distinguish records for the non-routine bioassays for the years and facilities in question other than for 1997 and perhaps for some of the years beginning in the mid-1990s. That's where you, in fact, have

enough RWPs and there's an accountable system such that you can track down and evaluate the job-specific bioassays but not outside of that timeframe.

Next slide, please.

Okay. I want to focus on the primary investigation. This is the RPRT-0092. And as we have made clear in several presentations to the Board, we continue to find that RPRT-0092 -- and this is NIOSH's evaluation of bioassay data for completeness for subcontractor CTWs at Savannah -- we think it's the most valid assessment of the SEC issue that we are addressing today. Okay. Just from a history standpoint it was the product of a detailed sampling plan that both SC&A, the Work Group and NIOSH reviewed and pretty much came to closure over. And it was based on the co-exposure guidelines and it addressed the completeness of job-specific bioassays for subcontractors.

I want to remind the Board that unfortunately despite finding 800-plus boxes of additional records in late 2017, and I say unfortunate because that was a, I think an opportunity that all of us thought would solve this issue, but it did not because inadequate job plan records were identified for the '70s, '80s and into the early '90s. And for only 773a, the A-Area and that was the only facility that could be, in fact, identified through these job plans. Gaps were identified. Even for that one facility and particularly for americium bioassays. So, even in that case there was definitely deficiencies.

And programmatically and we keep talking defense in depth but keep in mind that a working RWP program, I'm talking radiological work permits, RWP program was not in place at Savannah River until the mid-90s, 1993-94. So, you know, here's an operation, a large site that did not have an accountable system of tracking and ensuring permit required by assays were performed one that I think most of us would be familiar with in terms of modern operations. So, you know, it's a -- I would

say it's kind of a revelation that a program as late as the mid-90s would only then be implementing the kind of systemic RWP program that would, in fact, ensure accountability to bioassays required by those permits.

So, in summary and again we did present on our review of RPRT-0092 last year and I might add we have summarized in a table, which is in an appendix to a report that was issued last month, and you have that. We have summarized essentially the status of our findings, the discourse that took place with the Work Group, and kind of worked things stand. But in summary our conclusion remains that RPRT-0092 was unable to establish data completeness, which was the original basis for the Work Group referring the SEC issue to the full Board not with the impetus behind the Work Group submitting this to the full Board late last year.

Okay. Next slide please.

In terms of alternate investigations, and you might recall at the last Board meeting NIOSH expanded its basis for dose reconstruction feasibility when, again, the Work Group had advanced an SEC proposal. They came forward and proposed to include the NOCTS claimant data, the RPRT-94 data and plutonium logbook data together with the RPRT-92 and the weight of evidence approach, so-called weight of evidence approach. And the Work Group asked SC&A to consider this now expanded dataset.

Our evaluation is provided in our written report and work group presentation, both of which you should have. So, I'm not going to walk through all of that but in general terms we found that NOCTS and plutonium logbook data, and I'm going to refer to that as A, you know, Subject A or Topic A, or, you know, Record A, we believe that reflects routine bioassay data, routine bioassay data. And there's no ready means to compare it with the non-routine data, you know. Let's call that B, from job-specific monitoring.

So, if A is routine say NOCTS and plutonium logbook data, and B is non-routine data that would be job-specific monitoring, there is no way to actually compare those A to B because the B data is not available. We have not been able to distinguish or identify job-specific bioassay data such that one can do that kind of a comparison.

So, it leaves you instead to surmise or assume by the sheer force of numbers. And I think that's kind of where we have difficulty. The amount -- you're forced to actually try to apply the routine bioassay data points and examine the distribution and trends. You saw the arrows in that one graph. You have to look at the distribution and trends and actually try to discern whether those trends and those distributions are favorably inclined to support the case because you really don't have the actual non-routine job-specific bioassay data. So, you're kind of compelled to look at subcontractor data from the standpoint of the routine database and those that are on RWPs.

And I might add, as NIOSH has already acknowledged, and this is going back to RPRT-94 NOCTS data does not necessarily represent actual site data and any completeness must be inferred. And I go back to that term because it was used last year when we first started talking about RPRT-94. And as already noted, SC&A finds completeness by inference not to satisfy the tenets of IG-006, the co-exposure guidelines, which as NIOSH in its quote emphasized calls for a co-worker dataset to be based on a determination, a determination of whether there are sufficient measurements. And we think that's a stronger or a higher bar than an inference or a deduction.

While the Board needs to consider closely this apparent new interpretation of the co-exposure guidelines, you know, essentially because it will set a precedent for all future SEC reviews where data completeness is being addressed, we do not

consider relevant to these current SEC deliberations for Savannah River for the reasons stated. Okay. We again believe that if we are looking at applying a routine bioassay dataset as the means to compare with a non-routine that you don't have, there's little way you can demonstrate the representativeness that you need to accomplish by virtue of the guidelines. So, you know, it just doesn't work.

Next slide.

Let's talk about bootstrap. We, you know, got that late in the game. We, you know, received the review December/January whenever it was and did look at it and reviewed it as we could. And from our review of the analysis approach, and we had a statistician involved, I think our conclusion we find no fault with the statistical analysis. I mean it's a good tool. It certainly is based on a lot of precedent in terms of how these statistical tools are applied. There may be issues on implementation. I think that was mentioned yesterday by Knut Ringen in one of his comments, but in general it's not so much the way bootstrap would work so much as whether it is particularly relevant to the issue we are talking about here.

We have stressed and we continue to stress that, based on the co-exposure implementation guide and the hierarchy that's discussed in that, validating data completeness must come first. And if you, you know, the handout that we provided the Board, I think it's two or three pages, walks through the history of this issue as it, you know, was originally formed. And this issue came from the recognition early on back in 2017 that the records for subcontractors before the electronic database was put together was -- the records were actually maintained quit differently. You know, three by five cards, loose three by five cards and by company name.

And so, our obvious question was, how confident would one be that you had a complete set of that

and are we sure that the electronic database actually reflected all these subcontractors' transient as they are so that you could rely on that database. And at the time it was pretty clear that there had not been what we have called traditionally in this program a V&V, a validation and verification, of data completeness for that data.

And what we are saying here is that before one does the kind of stratification analyses that bootstrap represents, your first question is whether the data in the first place, in other words, your job-specific bioassay data is, in fact, complete or not and how do you know that. And so, so the analysis in an analytic way we are, you know, we don't have, nothing, no real issues with the statistical analysis provided by bootstrap. But we do have a problem with trying to apply it before one has confirmed the completeness of the data that you're actually applying it against.

So, again, we go back to that original issue and it actually is the original issue from 2017, you have job-specific bioassays but there isn't the confirmation of how complete that is going back in time before 1997 when it was established that many of those bioassay data points were missing.

So, anyway if I can get to conclusions -- there we go.

SC&A bases its conclusions regarding the -- this SEC on the outcome of NIOSH's detailed analysis of the completeness of job-specific bioassays. This is the bottom line provided in RPRT-92. And you'll hear us go back to RPRT-92 because we spent an enormous amount of effort working with NIOSH and the Board to design the sampling plan to actually build on experience that was in RPRT-83 and our review at SC&A that took place in 2017 or SRS in 2017.

And that was -- RPRT-92 was a two-plus year effort to look at the question of completeness of job-

specific bioassays for subcontractors on permits. Job plans or RWPs. And it was based on thousands of pages of permit and bioassay records for '70s, 1980s, 1990s. So, no small, no small job.

So, at any rate our conclusion was NIOSH had been unable, based on all that work, unfortunately, to demonstrate the completeness and representativeness of subcontractor job-specific bioassay data and we felt that was the case for at least the earlier years, that DuPont era, so to speak, 1972 to 1990 and without being able to ascertain completeness we just again felt that would preclude application of a co-exposure model as the guidelines provide.

Now, beginning in the early '90s, Westinghouse stood up an RWP program and, you know, sort of on the heels of the Tiger Team findings and a lot of attention by both the field and DOE headquarters, there was a fundamental revamping of the former DuPont program and an RWP program was put in place. It did have the kind of accountability measures, the procedures, the enforcement by management that focused on, you know, identifying the bioassays required and providing a process by which those bioassays would be done.

Unfortunately, a 1997 enforcement action showed the culture was strong enough that a lot of these measures didn't make a big enough difference in terms of completeness of those bioassays later on. But at the very least, we feel the circumstances in the '90s in terms of RWPs actually being written up is different than the situation in the DuPont era where you really didn't have much of a system. You had a job plan system, but it was up to the facility managers to implement that system.

That's all I have but are there any -- I guess we are going to go ahead and take questions from everybody for both presentations. So, I'll turn it back to Brad and Rashaun and, you know, I guess you can figure out and choreograph that.

Member Clawson: Okay. Well, that being said, thank you, Joe. I appreciate that and we've kind of given a back history of where we have been, and we have gotten to the point where we are at now.

Lockey, Ziemer, any other Board members I'd like to open this up for questions at this time and this way I feel like you're dealing with the full picture of both sides and not just one side. So, I'll open that up for any questions and I know that you had some, Lockey, I will turn it back to you.

Member Lockey: Well, let me ask maybe we can go rotation so we're going through and making sure we understand what's being presented to me. One of my problems, so the reason I unpack this data to go back and look at it again, is I find it troubling that we have two fairly highly competent groups with a lot of experience and knowledge evaluating a site that has hundreds and hundreds of workers with tens of thousands of bioassay samples and a rigorous groundwater monitoring program and they find it difficult to reach some type of consensus in relationship to dose reconstruction.

Member Beach: Jim. This is Josie. Sorry for breaking in. Could you speak up just a little louder. I don't know if anybody else -- I'm having trouble hearing you clearly.

Member Lockey: Is that better, Josie? Is that better? Josie?

Member Beach: I think so, yeah.

Member Lockey: Okay. And so, you know, that's one reason I went back and sort of unpacked this data to see if I could come up with some kind of explanation as to why these, why are two groups who I said are knowledgeable and experienced and they still have such divergent views in relationship to this rather extensive population with a huge database.

And it's been a process and I've gone through as many I can go through and I still have questions, as I'm sure you all do -- and I still have questions.

So, Tim, let me go back to your slides for a second. Do you have those?

Dr. Taulbee: Give me just a second to pull them up, not a problem.

Member Lockey: I mean you had the slides.

Dr. Taulbee: How is this? Can you see them?

Member Lockey: Go to Slide Number 8, that slide. Okay. Let me see if I'm reading this. I've looked at this slide numerous times and every time I look at it, I have to relook at it again. So, the way I read this slide is that you have 3200 samples and these are workers who have signed in and they -- into an RWP.

Dr. Taulbee: That's correct.

Member Lockey: Bioassay samples; is that correct?

Dr. Taulbee: That is correct.

Member Lockey: And then -- these workers participated in a routine bioassay sampling program with a radionuclide specified in the RWP, correct?

Dr. Taulbee: That is correct.

Member Lockey: And 95 percent provide samples.

Dr. Taulbee: Ninety-five percent participated in a routine program for those radionuclides.

Member Lockey: Right. They were -- the routine program covered those individuals.

Dr. Taulbee: That is correct. Yes, sir.

Member Lockey: And five percent did not and when you ran it through the algorithm, there was another

1.6 percent that went over and you were also covered, correct?

Dr. Taulbee: That is correct. Yes, sir.

Member Lockey: Okay. So, the question -- I guess the question I'm asking at least Westinghouse had set up what I consider a very elaborate environmental monitoring system and set thresholds at ten percent, used workers as sort of -- they didn't want workers exposed but they did have a routine bioassay program to see if their program was working correctly. I look at the plutonium levels and they're relatively low. I look at the tritium levels and they are extremely low.

So, I guess I'm getting -- I'm trying to understand, Joe, and this is the question I'm going to ask you now. If you look at the slide, if routine biomonitoring is covering 95 percent of RWPs for the specific radionuclide, what am I missing here?

Mr. Fitzgerald: You're missing the workers that would have been on job-specific bioassays for non-routine mixtures, non-routine radionuclides or you know, specialized work.

And I might point out by the way that this is a diagram of how the procedures, how the RWPs and related bioassay programs should have worked. Okay. This is the -- this was Westinghouse's intent. The actual practice, the actual on the ground implementation of this program was so deficient that DOE had to go to an enforcement action and one that actually applied to the entire DOE complex.

Westinghouse had to come up a corrective action program that took over a year, maybe two and they had to revamp their entire program, bioassay program so that, in fact, these non-routine bioassay, these job-specific bioassays were, in fact, performed adequately. And this was not a one-off situation in 1997 as both DOE and SRS acknowledged. This was a persistent problem that

went back a number of years and that required that they up the training, up the procedural compliance and held management accountable.

So, you know, I guess my difficulty is seeing diagrams like this and hearing terms like defense in depth when the actual result, not so much the expectation, not the policy, not what Westinghouse intended but the actual result on the ground was you were missing almost 80 percent of the required bioassays that RWPs required in 1997 and we have little idea of what the extent of that gap would be going back in time '70s and '80s and, you know, one could, you know, guess that certainly the compliance in terms of providing bioassays for job plans were much, much worse.

So -- yeah. Yeah, you know, I -- my reaction would be this looks really good, but I still go back to the fact that, you know, data completeness is a fundamental basis for deciding, you know, whether or not one can do dose reconstruction. That's why we developed a co-exposure model.

Member Lockey: Joe, let me --

Mr. Fitzgerald: I haven't seen evidence that we can actually speak to the question of data completeness for these kinds of bioassays before 1997.

Member Lockey: So, let me go back to the original question, though. Is this -- Tim, I assume that these 3200 samples are actual samples you looked at; is that correct?

Dr. Taulbee: This is actually an assessment that DOE did. And I'd like to point out that a -- this is what they put in their assessment, this was the existing process. So, this was actual. This wasn't nice to have or what Joe insinuated there, that, you know, a diagram of how it's supposed to work. This is what they found actually was happening. These bullets off to the side here of 1, 2, 3, are indicating

why didn't this person, this RCO note the requirement for the sample on the RWP. And these are the reasons --

Mr. Fitzgerald: What year was this?

Dr. Taulbee: This is 1997. This is the follow-up to the Notice of Violation as to what they found and what the process was. Okay. These 3200 samples, these are 3200 workers signing in on RWPs. So, it's non-routine work singing on RWPs. And this is what they found. Like I said, there's 1, 3, and 6, of you go down here to this portion you'll see that 1, the worker didn't realize a job-specific sample was required. This is what they found that led to that 21 percent compliance. That's the blue part here, coming over to the side. Okay. Worker submitted the required sample.

The red assessments here the 3200 this is a limited assessment that was done in the first quarter. The full assessment, which was done later, which is where the compliance ratio dropped from 33 percent to 21 percent when you back out the numbers from 256 you end up with 6481 instead of 3200 up here for that blue scenario. But we still had 95 percent of workers on a routine bioassay schedule and submitting their samples under that routine program.

Member Beach: So, Tim, this is Josie. Let me cut in for a second and ask. This diagram you have up right now, this is strictly for the year 1997 or was it --

Dr. Taulbee: That is correct.

Member Beach: Okay. So, what about between 1973 on up to 1997, what kind of samples are you looking at there?

Dr. Taulbee: For that evaluation we did not have an RWP program. There were job plans that were conducted and, on the job, plans we could identify

workers and one of the check-boxes on the job plans was respiratory protection. And so, what we did is we went through a very similar analysis of looking at the RWPs. We looked at these job plans and said, okay, this person signed in on a job plan that required respiratory protection; do they have monitoring, yes or no. We didn't look at whether it was job-specific or routine.

It really doesn't matter from that standpoint. If they were monitored under a routine or under a job-specific that's what we use for dose reconstruction. We are not just looking at job specific. We are looking at their work history and their monitoring. And that's the important thing that we use for dose reconstruction.

We can't do this analysis of job-specific versus routine. This was an assessment that was done by Westinghouse as part of this Notice of Violation. Okay. We don't have that resolution of data especially in the '72 to 1990 time period. All we can look at this worker signed in on a job plan wore respirator. Were they -- do they have bioassay monitoring? And that's what that assessment does.

And it really doesn't matter whether, in our opinion whether they are on job-specific or routine bioassay. We have bioassay for the subcontractors doing the work on that job plan or the RWP.

Mr. Fitzgerald: But the one thing, if I can just chime in. The one thing that is lacking is for those workers who aren't on a routine that's covered in the RWP for anything that would be outside of the routine source terms. There's a large percentage of those specific bioassays that went uncollected for various reasons, but they went uncollected. That was the impetus for the concern that came out of the self-assessment that Westinghouse did and what DOE reacted to.

So, you know, it's one thing to say that -- and it's not surprising if you have all these workers, this is

to answer Jim's comment too. All these workers working in tritium areas, plutonium areas and you have RWPs for specific jobs I'm not surprised 95 percent would have been covered by virtue of their routine plutonium sampling or their routine tritium sampling.

I would be concerned about radionuclides that they might have been exposed to in places like 773A doing D&D and waste management where you don't have those mainstream primary source terms like plutonium and uranium and tritium where you would rely on your job-specific bioassay to, in fact, pick up on and monitor for those non-routine nuclides. And for those, if you're talking 80 percent are not doing or performing these bioassays that would give you that answer, then you do have an issue. You have a gap in the knowledge for those particular nuclides.

So, this is not so much a question of tritium and plutonium and uranium and you see, certainly, you have a lot of graphs and tables looking at the routines for those for subcontractors. It's the non-routines that would not be covered by your routine program, which, you know, 1997, yes, there were 300-some samples that were not collected. Is that something to worry about? Yeah, I don't know. I don't think there is any data on that. We don't know what we don't know.

We don't know what source terms were missed. Now, 1997 we do because they went back and did a 100 percent resampling. But before that we don't know what the source terms might have been. We don't know the magnitude of the number of those kinds of job-specific bioassays that went uncollected. And we certainly don't know the trend in that particular issue going back to 1972, we have no idea.

The only reason we could even do the kind of analysis, which is illustrated in this figure is by the mid-'90s Westinghouse, again, I said that before,

implemented traditional RWP program that allows you to track the very numbers that you put up here. I can tell you that certainly before that RWP program was put up in '93,'94, there would be no idea of any of these numbers for that time period. And which is the reason we are talking that before Westinghouse there just isn't any information and I think you did say that, Tim, about routines versus non-routines in terms of job-specific bioassay. You have to go the mid-'90s or 1997 to do this kind of analysis and try to draw conclusions.

But I would contend you can't back-extrapolate what you have here to the prior years. There's just no way to know that.

Dr. Taulbee: The one clarification that I disagree with you on, Joe, is that we can start from here, of a worker signing in on an RWP, and we did that. We used job plans and RWPs and we could look at down here whether their sample was received.

So, it's all of the data that we have in RPRT-92 for A-area, which is 773A, one of the exotic areas that you mentioned. We have data for that area, especially in the 1980s and we could start here at the RWP or job plan and we could look down here in the bottom corner of whether their sample was received. So, we can get that resolution.

Member Clawson: Or 1997 --

Dr. Taulbee: No, for the 1970s.

Mr. Fitzgerald: Well, again, I would be pleasantly surprised -- yeah, I would be pleasantly surprised if one could do that kind of a tracking back in the mid-'80s at 773A. Again, without an RWP system and a facility-based program it would be difficult but at 773, in fact, implemented a rigorous RWP-like program for the job plans it might be possible to track this down. That wouldn't, and we've talked about this a lot, wouldn't help characterize the site or the other years. But nonetheless, you know, I

would leave it as an open question whether you could do it for 773A for the specific years that you're talking about.

Dr. Taulbee: That is what we did in RPRT-92. That is the A-area that we looked at with 773A. We started with the job plans in the 1970s through the 1980s, actually even through the 1990s, A-area is one of the areas we sampled. And so, we looked at the RWPs and job plans, we looked down here if they had a bioassay sample. That is what RPRT-92 does in between the years.

Mr. Fitzgerald: Yeah, but remind me, when you talk about have a bioassay sample, I think the protocol was to look at whether or not they had any bioassay sample, at least one bioassay sample for the facility in question, in this case the plutonium operations at 773A. But I don't think it's the degree of specificity in terms of what was written because nothing was written on the job plans that you could actually track. Am I right on that or am I mistaken?

Dr. Taulbee: No, you're correct. It wasn't written on there whether there needed to be a plutonium bioassay or fission product bioassay, but we looked at the location where the work was being conducted and what work was conducted there and that was how we made that determination and whether they were a respirator, yes or no, and if they did then that was when we went and looked to see if they had bioassay.

Mr. Fitzgerald: Yeah, and our review of RPRT-92, which encompassed the 773A analysis I think we were pretty I think concerned about the fact that there was no policy in DuPont area for a bioassay to actually stem from respiratory protection. That came along in Westinghouse's 521 I think it was called procedure that was put in place in '93 -- '92, '93 where there was actually a specific requirement for bioassay following respiratory protection and as you just pointed out, we did not see any linkage between a job plan and a specified bioassay. There

was nothing. And I looked through every single job plan that was there for 773A and you could assume that, you know, whatever bioassays were done for a particular worker was, in fact, tied to the job that they might have been involved with. But there was no one-to-one linkage that says this is what the job plan required because the job plan had no requirements for bioassays and what bioassay was in fact done.

And 773A is problematic and we pointed that out too, as did Westinghouse later, because it had -- because it was a laboratory operation there was an evolving and very changing set of source terms. I mean you had one-off experiments. You had research going on. You had, you know, a number of different activities that involved nuclides that were non-routine nuclides.

So, it's not an easy facility to say that you could ascertain by facility, you know, just by the facility identity what the source terms would have been on those bioassays. I think it's pretty clear and this was a precaution that Westinghouse actually put out in '98 that one had to be very careful with 773A because the complexity of the activities and the nuclides that were being handled.

So, I, you know, I hear what you're saying but, you know, we have indicated in our, in our reviews that it is very problematic to, you know, to take the kind of conclusions that we are talking about from '97, which is where I think you actually begin to get very specific information based on a program that's a modern program, modern RWP program and try to back-extrapolate that 20, 25 years and believe that, you know, you have a way to ascertain completeness, data completeness.

And that's the crux of pretty much what we were looking for, was any way to go back in time, given the findings in 1997 and figure out, you know, whether it would be non-routine job-specific bioassays that data is complete, complete enough

where you could have confidence applying a co-exposure model. And the frustration, you know, and the fact going back to Jim's comment, you know, we haven't been able to get consensus is the fact that we can get past data completeness. That's a fundamental, you know, start here, do not pass go type of thing. And if you can't establish data completeness everything that would follow afterwards, the stratification, the comparisons, the co-exposure model isn't feasible. Isn't well-founded and that's probably the frustration that all of us feel.

But, you know, we still can't ascribe to the data completeness of these bioassays because programmatically and from a standpoint of the records themselves, there's no way to actually pin down, you know, how complete they are.

Member Lockey: Let me answer --

Member Clawson: I want to -- hold on a second, Jim, I want to be able to go back to why we are actually even getting here because I want to, I want to make sure everybody understands what the Work Group did when they chose these years.

We chose years that we felt that there was very insufficient data. In getting into the '90s everything was changing. I thought this was going to be a very simple thing. If we would have had the data, we wouldn't be sitting here today. If would have had the completeness and everything else, we wouldn't be sitting here. That has not been touched.

I want people to realize what SRS really is, 310 square miles of facilities. This was a leader. Did you realize that DOE was not even allowed on Savannah River? DuPont ran everything. They contracted for DOE for widgets. Don't come into my plant. We own it. We do it.

There's a plaque sitting on their wall in SRS I believe it was the late 1970s when there was an agreement for them to even be able to come in

there. We are sitting there saying that we can back-extrapolate from 1970 back into -- no.

You know what, I've got to go back to not my history of what I went through. DOE has lots of rules out there and everything else like that and they take ten to 12 years to be able to implement. There've been times that we had to shut down because we could not operate under the requirements because they didn't understand what it took to do this. DuPont was a very interesting contractor. DuPont did things the DuPont way.

I felt that this was a very clear-cut timeframe to where we could actually cut this out and be able to work this. And same as the Work Group did with this. If we had the data, do you think we'd really be sitting here today? No, it's opinions and we could back-extrapolate, and I don't want damn smoke and mirrors. I want the information and if we can't do it, that's where the SEC comes in. If we have insufficient information, that's where the SEC comes in.

Member Lockey: Well, Brad, I think we have sufficient information from 1980 on. I don't -- I think prior to 1980 it's really iffy for me.

But let me ask Joe, Joe and Tim, I have a question to ask you. I went back and pulled the violation that Westinghouse was issued and it's an interesting read and there's no question there was a violation they had an internal program where they were supposed to go back and do sampling analysis of specific job tasks and they didn't do that. That was their internal program. At the same time DOE has noted that they had a very rigorous and comprehensive and the comprehensive use of a field indicator -- indicators doing work activities the single unexpected events and they had an extensive air sampling and surface survey. And I would expect that in the 1990s based on the number of plants I've been through and where I have been.

What I'm asking, Tim, did that exist -- previously did that -- do we have documentation that that type of rigorous program as identified by DOE was in existence during the '70s?

Dr. Taulbee: Yes, we do. If you go and look at the survey contamination results, there are thousands and thousands of pages of those along with air monitoring and at all of the facilities, that those were conducted. So, that is a history that is there. We certainly -- we don't go into that level of detail for dose reconstruction, so we haven't captured all of that by no means. And plus, I don't think we could, actually, I mean there's thousands and thousands of pages.

So, yes, that did exist beforehand. And one of the things I would also like to point out is that SRS's procedures for monitoring of the workplace environment, surface contaminations, and air sampling is well documented in procedures manuals. These are DuPont procedures manuals. And we see that that data was collected, in fact.

Member Clawson: So, wait a minute. So, Tim, you're saying this robust evaluation. Let's go to Par Pond. When did they stop them from fishing in Par Pond because of the contamination in it and having the fish fries on Friday afternoon?

Member Lockey: Brad, I can't answer that's like --

Member Clawson: 1995.

Member Lockey: I can't answer that.

Mr. Fitzgerald: Dr. Lockey, can I answer that question?

Member Lockey: Yeah, go ahead.

Mr. Fitzgerald: Okay. Yes. DuPont and I've lived this in real time experience when I was in charge of safety for DOE headquarters. So, I know -- I knew in the '80s what DuPont was about. DuPont had a

world class safety --

Member Lockey: I didn't hear what you said. You were in charge of what?

Mr. Fitzgerald: I headed safety at DOE headquarters. Okay. In the late '80s. So, I had firsthand experience.

Let me just, you know, provide some perspective on this thing and this is I think the reason why there's a lot of misunderstanding about even DuPont. DuPont had a world-class reputation record for safety performance. Okay. Unparalleled. I mean when I went to Savannah River and sat in the car, the DuPont driver would not start the car and I asked him why because I had not put my seatbelt on in the back seat. And that's the level of safety regime. I mean it was very, very stringent and very driven.

At the same time DuPont was, like many DOE contractors, in an insular world. No one really bothered it. DOE didn't review it. It was -- it did its own thing. It was very much an expert-based safety culture. It was based on pretty much DuPont-developed protocols, approaches to how they did business. And these approaches pretty much remained the same from the '60s, into the '70s, into the '80s.

The problem is rad protection and nuclear safety had progressed beyond that point. So, when you got to the situation in the '80s you had a problem where, you know, a Tiger team from the outside and this is the, you know, this is one of the first times an independent review was done. Not an in-house review but an independent review came in to look at, you know, safety performance and safety programs as they ought to be in terms of national standards and national expectations and departmental expectations.

DuPont fell very short, and the Tiger Team findings

are very much ones that we have cited. They are available for anyone to look at. But they essentially found that, you know: one, DuPont wasn't enforcing and managing bioassays adequately and weren't ensuring workers were providing bioassays. That sound familiar?

They also found that there wasn't an RWP program being implemented even though that was something that you would expect to find in that program. They found that site characterizations where you would characterize the radiological source terms so that they would be appropriately identified in RWPs -- well, in this case job plans. That was not being done adequately in any facility except the Naval Fuels facility, which is just one facility out of the 30-plus.

So, yes, there was a world class safety reputation. But it was, from the radiological nuclear standpoint, it was a program that had fallen out of step with modern expectations. And when K reactor went down, okay, it went down because the operators, this is after Three Mile Island, did not have the knowledge necessary to know what they were dealing with and came up with some anomalies that they couldn't handle, and they didn't shut the reactor down when they should have shut it down.

The investigations that took place afterwards confirmed that DuPont had a very insular nuclear and radiological program that was out of step with what would have been required at other radiological facilities.

So, you know, keep things in perspective that really you did not have the kinds of robust programs that I think seems to be touted for Savannah River in that timeframe and it was only from the dual shock of DuPont leaving, Westinghouse coming in, K reactor, the production reactors being shut down for good. And with the Tiger Teams and a new Secretary of Energy, Watkins, a new Assistant Secretary, Paul Ziemer and other notables that made a wholesale change in the way things were

run there.

So, really it was only the early '90s, if you want to talk about robustness, and a health physics program that would compare with other sites, it was only in the early to mid-'90s that that happened. Okay. Before then you had an expert-based, a facility-managed program. It was the facility managers that called the shots, decided who got bioassay, whatnot. There wasn't the RWP site-wide requirements that you have now.

So, you know, if you look at it from that context, it's less surprising to see situations where you have gaps in bioassays and where it's not easy to find the kind of records that you want to find when it comes to these non-routine exposures. The routines are straightforward. You know, no one who is on routine monitoring for plutonium and tritium and whatnot, are likely to be missed. The production workers are going to be covered. But these subcontractors and transient workers, that's a different story and one where the site was not -- did not easily adapt to the thousands of -- or hundreds and thousands of workers that came on site to do these specialized jobs.

So, it -- I do think that the operational history of DuPont and Westinghouse are very pertinent when you're looking at questions like this.

Member Roessler: Brad, Brad.

Member Clawson: Yes.

Member Roessler: Can I say something?

Member Clawson: Sure.

Member Roessler: Okay, and then I see David has his hand up too. I'm not sure how productive this conversation is. It seems that we're getting a lot of selective information, speculation. I think it's really distracting to the whole conversation. And for those of us who are Board Members trying to sit here and

make an evaluation, I guess it's difficult.

I'd like, and I guess the other thing I see is, every time a specific problem is brought up, and if Tim is given the opportunity, he can support his theory with regard to doing dose reconstruction, and answer that concern.

I'm mainly interested knowing is, could there be a group of workers missing from this co-exposure model. And if they are actually, with regard to dose reconstruction, can that be bounded?

I mean that's the thing we're really looking for, not a lot of little ifs and buts that maybe we speculate on.

Dr. Taulbee: If I could address that, Brad. We don't see any groups of workers that are missing, Dr. Roessler. And how we base this is based upon this particular graph here that I have, of the subcontracting monitoring in NOCTS.

These are from the claimants. And we see all of the subcontractors, CTW groups, identified, the electricians, pipefitters, laborers, carpenters, iron workers. And we see that all of them have monitoring data.

So, we don't see that there is any subgroups that are missing. And that's the context of the IG-006, the Implementation Guide for co-exposure models. So we're not seeing any of those particular groups, where we're missing data from that standpoint. I hope that answers your question.

Member Roessler: Yes, thank you.

Member Clawson: Okay. So NOCTS data, how good's the NOCTS data? I mean 100 percent, Tim. I want the exact, how good is it? Is it just so clean that we shouldn't even be here?

Dr. Taulbee: NOCTS data is, this represents the claimants. These are the people who have filed

claims. And so this data, we've got a total of 6,000 total SRS claimants, 886 are subcontractors. Okay.

So, we have data for these subcontractors, construction trades workers. And so this is a representative sample of the entire population. And a case could be made that these are the -- it's a subset of the total population. But these are people who got cancer. These are people who got cancer and filed claims.

So, if you're looking at it from a holistic type of approach, these are the people who should have the highest exposures. These are the people --

Member Clawson: Should -- this is where we get into our problems, Tim. They should, we really don't know. But, you know, in theory this would be -- yeah, it should be. We don't have an ideas if we've got the highest ones or not. These are the people that are filed and there is a lot of people that haven't filed.

And we've seen this at numerous sites. This is where the problems that we start to get into, Gen. Yes, this looks great, but this is a -- it's so what. The NOCTS data, we should be in there, we shouldn't. That's our problem. It's, this is all, should, it should. I don't want should. I want is. It is it. This is the clean information and we don't have that.

Member Richardson: Brad.

Dr. Taulbee: I see Dr. Richardson has his hand up.

Member Clawson: Go ahead.

Member Richardson: Thanks. Could we go back to the previous slide we were looking at with the flow diagram?

Dr. Taulbee: Certainly.

Member Richardson: One of the points of contention

when thinking about, sort of the co-exposure model, it seems to me to be, Tim, as you were describing this flow diagram -- which is very helpful -- was an assertion you made several times that the sample received, it doesn't matter from your perspective, whether it's a routine or a job-specific bioassay. The fact is that the sample was received.

And I can see that from one perspective and I, but it seemed to me one of the issues being raised, in thinking about the co-exposure model is, where does the missing data, where do the missing data arise? And are they, and is it, what causes missingness?

So the co-exposure model should work under certain conditions. And that's where -- let me stop there. So, in the flow diagram, it appears that for routine, for the routine bioassay monitoring program, there's very little missing data.

And for the job-specific bioassay flow, arm of the flow diagram, there's a substantial amount of missing data. So, one of the determinations of missingness is, is it routine or is it job-specific? So, from that perspective if we just think about what's the mechanism leading to missingness?

Routine versus job-specific is important. If, again from your perspective, on the modeling side of deriving a value, you don't really care whether it was routine or job-specific. It's we have the data. We observed those, this number of values for these characteristics, the workers.

But for us to do, to use the co-exposure model, we would have to believe missingness is kind of non-informative, between these groups. And so the question maybe that I have is, for a co-exposure model, for assigning values to workers for different types of radionuclides that they might have been exposed to, does it matter if it's job-specific versus routine?

Dr. Taulbee: We don't believe that it does. And let me back that up a little bit here. When we did Report 92 and did the evaluation, we were basically looking at the very first box. Worker signs in on an RWP, and did they leave a sample? Yes or no?

And so that was the one main question. For those workers where the answer was no, they did not leave a sample. We went back to look at those RWPs to see if there was a worker on that RWP, that did leave a sample. And that's where it becomes applicable for the co-exposure model.

And so we looked at those workers who were not monitored, to see if they worked on an RWP with somebody who was monitored. Kind of the very definition of a co-exposure model, they worked alongside one another in the workplace.

And when they did that, that was what we did in Report 92 and referred to it as effectively monitored. And when you look at the percentages of effectively monitored in Report 92 for A Area -- that gets into the pre-1990 type of time period -- what we found is that there's a large number of these subcontractors who would be following down this kind of job-specific path. And not leaving a sample, that they were physically working on the same job plan as somebody who was monitored.

Member Richardson: But --

Dr. Taulbee: That's what gives us confidence that that co-exposure model is valid.

Member Richardson: But Tim, when you do that, for that comparison, is that a comparison of the 70 or 80 percent of the workers who were not monitored to the 20 percent who are also moving down that same flow diagram, who were monitored?

Dr. Taulbee: Could you say that again? You lost me a little there.

Member Richardson: So if we move down this

pathway to job-specific bioassay. Are you saying that there are workers who had samples, who should have had a job-specific bioassay? Twenty percent of them did have a job-specific bioassay and 80 percent didn't, but you compare those and that's the definition of the coworker?

Dr. Taulbee: No, we looked at basically this group over here, of sample not received.

Member Richardson: Yeah.

Dr. Taulbee: Okay, and then we looked to see if there was somebody else on that RWP that was monitored, whether it was routine or whether it was the job-specific.

Member Richardson: I mean you didn't know whether it's routine or job-specific --

Dr. Taulbee: No.

Member Richardson: One could imagine, and this is, I think this again gets to the nature of it, you don't know whether you're comparing them to the routine people or to a job- specific.

So, let's say that because they had the same job title in the same year, under the same work plan, they were job-specific as well. That comparison would have been between two people who, one of them, actually collected a sample for that job-specific task, and another one didn't.

Dr. Taulbee: All we look, all we were able to refine was did they sign in on an RWP, and did they leave the bioassay? And the ones that did not, we looked to see if they worked with somebody who did.

Member Richardson: Okay.

Dr. Taulbee: That's the best we could do.

Member Richardson: Right, I'm not -- I'm just trying to understand it, because, you know, naively one

might think that the types of things which are monitored for, and the exposure conditions for the routine bioassay program could lead to different types of exposures and magnitudes of exposures, than those which one encounters under the job-specific bioassay plan, where they're having things which are non-routinely encountered. And so they might be different.

And yet the imputation is largely to the job-specific front areas where there is missingness. And attempting to impute with the routine information, which is the vast bulk of the non-missingness.

And that's, so this is my question, is, if we, you're saying that the comparison that you did in that example, those appear to be comparable? Which maybe from a process idea at least as kind of -- I still am, I'm kind of a little surprised I think.

Dr. Taulbee: I mean the key is that they both signed in on the same non-routine RWP. Both workers did. And so one was monitored and one was not. That's why we feel that the co-exposure model works.

Member Clawson: But Tim, when you say that, how many people are on these RWPs?

Dr. Taulbee: It can vary, 20, 30 --

Member Clawson: This is the point I'm trying to get to. Because not all those people made the dives. That person that submitted that bioassay may not have been the one that went in.

Dr. Taulbee: We specifically looked at workers that went into the areas with sign-in, sign-out, and that they were matched at the same times. Okay, we specifically looked at that.

If somebody went in and we didn't pair them with somebody else that went in on a different day on that RWP, no. We looked at workers side by side in the same radiological environment.

Dr. Kotelchuck, I see you have your hand up.

Member Kotelchuck: Yes, I'm here --

Member Beach: Dave, you're on mute.

Member Kotelchuck: Yes, I did. I -- we rely, I mean as Board Members who are not Members of the Working Group, I mean we rely often on the recommendation of the Working Group. And I don't, I'd like to hear from Brad, what was the recommendation of the Working Group that was given to us last time? Was that unanimous? And if it wasn't, what was the vote?

Member Clawson: It was unanimous.

Member Kotelchuck: Recommendation for --

Member Clawson: For an SEC.

Member Kotelchuck: Okay.

Member Clawson: Then when we got to the presentation, one of them had a lot more questions. But when we took the vote, it was unanimous.

Member Kotelchuck: Okay.

Member Lockey: I can answer that, Jim Lockey. I -- Brad and I agree that this has gone on long enough and we needed to get it out. And I vote, my vote was to, we need to get this out and have the Board decide it. But then we had some additional presentations.

And at that point, I went back and what I call, is unpacked the data, to look at the data more detailed. Because I was having trouble really understanding the discrepancy between these two, what I feel are very reliable groups, trying to see why there is a discrepancy --

Member Kotelchuck: Well I -- Jim, I respect the need to come to some decision. It is striking to me, if not embarrassing to the reputation to our

Advisory Board that we have something, that we have an SEC petition from people who introduced it 15 years ago, and we're talking about many of them have passed away.

So I do feel, I share the feeling that we do finally have to come to some decision. That way the people can, who are claimants, can either accept whatever decision we make or appeal that if they feel they should.

Member Clawson: And Jim, I apologize if I made it sound wrong to that. I honor everybody's opinion on this. And each one of us has our own vote. And we vote for what we feel and that's all I can ask. That's all we're trying to do. But at some point, we have to be able to take care of this and get to the point.

We all have one vote. I did not want to single you out in any way.

Member Clawson: And Jim --

(Simultaneous speaking.)

Member Lockey: And you and I agree, we both talked about the frustration that we've had. And I don't, and particularly after our last look for data. Went back, and you know, talking about, Joe was talking about before 1995, 1994 was there any other additional data and records that could help us? There wasn't any additional data.

You know, at that point I said, we're not going to look for any more data. We have to make a decision. And from my perspective this decision is really, was down to a board deciding at what level of precision do we need in this, what I feel is a very extensive database, in order to say we can do dose reconstruction or we can't do dose reconstruction?

What's the level of precision we have to arrive at? And that's not an easy decision, but I think that's where we're at, Brad.

Member Clawson: And I understand, you know, we've -- somebody isn't on mute that really should be, I think, Rashaun.

You know, we went through the same thing with this with Fernald. The whole thing was, was Brad, but we have 350,000 urinalysis, look at all this data. But if it is not the right data for what we need, it doesn't work.

Member Lockey: Brad, what --

Member Clawson: And that's where I get into the problems with it.

Member Lockey: Yes, and Brad what troubles me about it all is that, you know, NIOSH has looked at the data using different methodologies. They looked at NOCTS data to see if that comparable and it was.

I know you raised the point is, that maybe the non-claimants have higher exposures. That possibly is the case but from a medical perspective it's probably not the case. But that's just from my medical experience. And cancer tends to occur, it's dose-related and the higher the dose the more likely you're going to get a cancer. That's just the way cancer works.

But that aside, it gets to a point of, and I think in the comments yesterday, I think Knut said it to us, I think, you know, the bootstrap analysis was a good analysis. It's a good analysis that you'd use on established data. It doesn't tell you about data that's not there. It can just tell you how the data is distributed.

And he's probably had experience with it in the construction trade worker analysis. But he said it's not going to help you on an individual basis. It's not going to help you on the individual worker. And that's actually true.

So, I think as a Board, we have to decide, is the level of precision that NIOSH has derived in

relationship to their idea that they can do dose reconstruction based on the objective data they analyzed, adequate?

And one of the things I've asked for is, is there any objective data that indicates that what they've done is not correct, in this extensive database? And as far as I know, Panel Members can correct me if I'm wrong, I don't think that data exists.

If I saw standard deviations for instance in the tritium, that were astronomically and not anywhere close in comparison to the prime construction workers. And that curve was much much higher, I would say this is not enough.

It's not representative, there's no question about that. If I saw differences in the plutonium data, then that would raise all kinds of red flags to me. If I saw differences in the RNP data between the groups, that would raise all kinds of issues to me.

I definitely have issues with the 1970s, because there's no, particularly '73 through '79, there's a real paucity of data, and I have an issue with that. But after 1980, I haven't seen anything that to me raises a red flag that there's objective data out there that's not covered by the dose reconstruction within 95 percent confidence intervals.

Member Clawson: And these are your opinions and they're valuable opinions --

Member Lockey: Yes.

Member Clawson: But I want to make one thing clear, not using the NOCTS data is speculation. Because you do not know, period. You're thinking, well you know, this should work this way. But it's, you know, you're infer -- you can't use that. This is what I'm having such a hard time with.

Member Lockey: It's maybe, Brad, it's just I've -- I deal with cancer so much from an environmental occupational exposure, and if cancer's, I'm an old

person, so cancer is an old person disease. It's a reflection of lifetime cumulative social or environmental or occupational exposures. And any --

Member Clawson: What --

Member Lockey: And it is a dose response disease process. So the people that have cancer are in general, are going to have higher dose.

Member Clawson: Well and Jim, I don't want to criticize in anything but I want you to realize something. You're deducing that or inferring based on red flags that can't show or demonstrate because we don't have the information.

Member Lockey: Well, and --

Member Clawson: You're looking for a red flag. I could, I bet you, I could tell you what, I could run a lot of numbers right now and make everything look really rosy. But I get back to the same thing that has been the very one issue from the beginning. And that's the validation of the information. And I still don't see it.

Now that being said, that is, each one of us has a vote on it. Each one of us has our opinion on it and we can go from there.

Dr. Roberts: Okay, can I interject here. I've been just trying to just wait so that I'm not talking over anyone. But there are a couple of things that I did want to clarify. I know Dr. Kotelchuck asked about the vote and the Work Group to bring the recommendation for adding the SEC to the Board.

And Brad, you're correct in that it was a unanimous vote among the Members that were in attendance of the Work Group when that vote was taken, but Dr. Richardson was not present for that.

Member Clawson: Right.

Dr. Roberts: The other thing I wanted to just check in on is that we do want to give the Petitioner an opportunity to speak and to make their presentation. Unfortunately, in the last meeting there wasn't enough time and they got cut off. So, I want to make sure that we are extending the courtesy to the Petitioner that would like to make their presentation.

So, I'm asking if this is a good time. I know the discussion is still continuing about the two presentations we've seen so far. But I do want to make sure that we do hear from the Petitioner and that they have adequate time.

Member Kotelchuck: Rashaun, is this an appropriate time for a comfort break, after we decide what we're doing?

Dr. Roberts: Sure. That would be fine with me. But yes, let's try to get the path forward after the break.

Member Lockey: That would be good for me.

Member Kotelchuck: Yes, thank you.

Dr. Roberts: So, Brad are we dismissed?

Member Clawson: Yeah, let's take a ten-minute comfort break. I see it as being what, 2:30?

Member Kotelchuck: Right.

Member Clawson: Then, let's come back in ten minutes.

Member Kotelchuck: Okay.

Member Clawson: So 2:40.

Dr. Roberts: Ten minutes, and at that point will we open up with the Petitioner?

Member Clawson: Yes.

Member Kotelchuck: Yes.

Member Clawson: At that time we'll open up with the Petitioner, thanks.

Member Beach: Sounds good.

Dr. Roberts: Thank you.

(Whereupon, the above-entitled matter went off the record at 3:28 p.m. and resumed at 3:41 p.m.)

Dr. Roberts: So, before we broke, we said that we would lead in this portion, hearing from the Petitioner. And I know that Mr. Fester sent a presentation that he wanted to make. His exhibits were circulated to you all prior to this Board meeting.

So, Mr. Fester, are you ready to go with your presentation?

Mr. Johnson: Dr. Roberts, this is Warren Johnson on behalf of the Petitioners, and I believe Mr. Fester will have some comments after me as well.

Dr. Roberts: Okay, great. Welcome.

Mr. Johnson: Thank you. And I've circulated our exhibits, I'm not particularly good with technology, so I'm going to just comment and reference the Bates stamp numbers on those, but otherwise not attempt to share my screen or slow this down.

I understand it's a long day, and we're going to try and be brief. Having said that, as has been discussed before, this has been going on for nearly 15 years, and I feel like every meeting is, to some degree, Groundhog Day. We just keep doing the same things over and over again.

I don't dispute that NIOSH has done the best they can, but I think that's the point here, is that their best is not good enough to ensure claimant-favorability and to carry out the mission that

Congress has assigned.

A lot of talk's been made of the job-specific versus routine bioassays. The job-specific bioassays are somebody's, some RadCon person's decision and professional judgment as to what is necessary for that worker to be considered appropriately monitored on that job.

You cannot ignore the importance of the fact that they ignored requiring that job-specific bioassay, that means that person was not appropriately monitored.

To substitute the routine, and consider that effectively monitored, overlooks the fact that they required that to address specific radionuclides of concern for that job, and also the timeliness of that.

We have not discussed how -- what is the proximity in time from the job, and when they should have submitted a sample, to when it may have gotten caught on a routine.

That's a significant difference because of the body's effort to get this toxin, or this radiation out of it. And that's, the body metabolizes. And so, you're also going to have a falsely low dose if you catch that on routine versus the job-specific.

So, ignoring that is just trying to get numbers to plug into a model, versus trying to get accuracy, and trying to provide a claimant-favorable, accurate dose reconstruction.

The second problem that Petitioners have with NIOSH's approach is the fact that they make a lot of assumptions that are based on the, well, the assumption that the Savannah River Site always followed its written procedures. And, in fact, I think there was, quoted at the last meeting by, I think it was Dr. Cardarelli, radiological practices were consistent with DOE orders in place at the time.

Well, what I provided to the Board, I think

demonstrates that that's not true. Approximately a million dollars in fines from DOE is pretty strong evidence that that assumption is incorrect.

I'm going to briefly go through those violations because there seems to be this feeling that somehow everything got better after the Tiger Team came in, and that somehow the low participation and follow-up bioassays was a one-off event that they fixed.

Well, if you look at Petitioner's Number 2, that's Enforcement Action 9712, roughly 100,000 in fines, notes violations for multiple failures to follow your radiological work control procedures. You failed to stop and evacuate when airborne radioactivity exceeded stop-work level of the radiation work permit. That happened approximately a hundred times.

Failed to follow a procedure leading to unplanned and unnecessary intake, and significantly, violations are similar to deficiencies reported in 1995. Well, that's in '97, still doing it.

You look at Petitioner's Number 12, Enforcement Action 9809, another 75,000. Workers and management routinely failed over a period of two years to follow the procedures and as it relates to radiological work.

DOE identified bioassay sample submittal deficiencies as early as November 1995. Enforcement Action 2000-08, another quarter million dollars. Significant deficiencies in quality assurance, radiological work practices and controls, procedural compliance, in response to off-normal conditions.

They note similar deficiencies were identified in the prior 1996 event. Number 36, that's Enforcement Action 2002-01, violations of radiological control, contamination hazards not recognized. Resulted in contamination of an uninvolved worker.

And Number 39, Enforcement Action 2004-03, another quarter million dollars. Violations of FB line facility for work processes, ALARA violations, written procedures not followed, again, and Number 4, falsification of radiation dose records.

So, to look at the documents and assume that they always followed on, and therefore, the way we know somebody didn't need to be monitored is there's no records, quite frankly, is just wrong. And there is certainly no way to convert that into claimant-favorability.

As it relates, to NOCTS, there is a problem in that it only represents those people who have developed cancer and filed a claim. The second part though is that, and that omits a number of people. The second part is that, it is based on, as I understand it, the numbers represented there are the recorded doses.

And if you'll look at Number 54, which I produced, this is a document created by Savannah River Site, Head of Radiation Physics, Dennis Hadlock, in response to some private litigation, and I've redacted the gentlemen's name, but his badge number is listed in the dose estimate.

As you can see, this was based on, as a result of the deposition, an unrecorded uptake was discovered in his chest count for americium-241. And that was from a test done in 1973, that was the first chest count they had ever done on him.

The resulting dose in a claimant-favorable, or the most conservative dose estimate applied was 43.4 rem as a result of that one uptake, and that's referenced on Petitioner's Number 59.

Well, if you look at Number 60, the official dose, as of 2007, as of the time this family had applied in NOCTS, shows internal zero. He had never had an uptake of any kind, according to that.

The 2016 reconstruction, from that one uptake, would not be reflected in NOCTS. How sure can you be that every, that there's no other instances just like that? Have we looked back at every chest count? Have we looked back at every whole-body count, every bioassay, and looked at the timeliness of those bioassays?

We certainly haven't because we don't have those records. That's part of the problem here. There's been a number of references to the change in culture, or the problems with culture.

And at the last meeting I referenced the Atomic Energy Commission's -- the legislative history from one of the congressional hearings regarding the site, and it discussed the concerns over telling workers that they were getting a dose. And the concerns that that would lead to increase in claims and hazard pay, and poor morale.

Well, the next exhibit that I attached is labeled Petitioner's 61. This is a presentation done by Mr. Hadlock on behalf of the Westinghouse Savannah River Company, discussing the use of personal air monitoring at its site. And what they were doing was testing the people that were working, basically, cutting the trees.

And they put personal air samplers, or lapel monitoring on these people, and were finding that even doing the tree work, they were getting a dose. It was small, but it was because of the increased, primarily, cesium-137 around the site, that these were considered radiation workers.

And if you notice on Number 77, when they -- this was dropped because, as he says, non-HP management was concerned about the impact to the workers being exposed internally, and disagreed with our programmatic approach. Then they go on to scrap it because no one told our workers they would get internal dose assigned when wearing a personal air sampler.

Assigned a dose. That's different than if you don't assign it, that doesn't mean you didn't get it, that doesn't mean that it's healthy. But that's what happened, as it was bad for morale. And if you look at the last page of that, Page 83, it says, continuing problem of management workers believing that if routine bioassays is negative, it means zero. This concern was essentially dropped. Beating up your bioassay program is not a good career path.

The point of that is that culture, it continues. The belief that it's better to not tell the workers that they're being exposed, it's better for them, it's better for morale, is just wrong. But it illustrates that if that's still a concern in modern times, and we've seen it back from the '50s on, quite frankly, that may explain why we don't have some of these records.

But, the other part of it is that there's been a, every meeting it seems there's a reference to the destruction of the records, or the gaps in the records.

And NIOSH has been pretty strong in there, or committed to defend that there's no evidence of the destruction despite even Congress recognizing that. And I guess to that, I would just note, it doesn't matter whether they were destroyed, it doesn't matter whether they're lost, it matters that they don't exist.

And if they existed, perhaps, you could find a dose with sufficient accuracy, and ensure claimant-favorability. But we don't have the records, we don't have enough records. And these attempts to redefine what is monitoring simply to get numbers so that you can plug it in to a formula, it still can't average out the inaccuracy of that. You cannot just create new data.

I think Mr. Taulbee referenced that in 092 that the effective monitoring is essentially a coworker model. Well, that's to get enough numbers to be able to

plug into the next coworker model, they're trying to create a mini coworker model. And I've been through a number of these files where you have a number of people involved in an incident, and every one of them tests different.

It's rare that you're going to have two people, doing the exact same job, and they're going to have the same uptake. That's just, it's unlikely, and but, what we're doing here with this coworker, or the mini coworker model, is just assuming, well, we found somebody that was somewhere in that facility, doing a similar job. And therefore, we can consider anybody else around there effectively monitored, so we can expand the numbers and get the accuracy, somehow.

Again, I think that this is, yet another effort, and I commend NIOSH on their efforts, but they just, they don't have enough data to go by.

And for 15 years, these families have been receiving dose reconstructions that tell them that this is the dose that your loved one received, and then more information is discovered, then there's a rework, that dose reconstruction is vacated, and they do it all over again.

For 15 years NIOSH has been saying we've bound, we have bound the dose, we can bound the dose. And now, today, we find that we're going to scrap everything that was required in 092 because we didn't need it anyway. And we're just going to go by NOCTS and we can get there another way by bootstrapping.

I think this is just, yet another, round that demonstrates that the data is not complete and it's impossible to feasibly bound a dose with sufficient accuracy to assure claimant-favorability. And for that reason, I would submit that the SEC needs to be granted, and my colleague, Josh Fester, I think, has some additional comments.

Mr. Fester: I do. Thank you, Warren. In anticipation of Work Group meeting today, or the Board meeting, in a discussion with Warren and Dr. Ringen, we thought it was important to look back at the timing of the Board's work on this. And I was pleasantly surprised that the SC&A team was sort of thinking along the same lines, and essentially provided somewhat of a time line in their position statement, provided ahead of today's meeting.

And I know, we've discussed this every time, every opportunity we've had for public comment, but it can't be understated that this is, this is about real people. And time matters to these EEOICPA claimants.

We've had petitioners die, hell, I had two widows call me this morning before this meeting today about their potential claims. And that's typical, you know, that's a typical day for me, typical morning.

The original, authorized representative and attorney, who led the SRS SEC petition for years, Bob Warren died last year. To put this into further context, you know, I wasn't even out of high school when this petition was originally created, you know. And now I've been advocating for these claimants for going on six years as an attorney.

Warren Johnson, and I like to joke that he and myself have three, between the two of us, three children in kindergarten this year that their existence wasn't even considered when this Board began working on this issue of subcontractor dose issues in 2013.

And, you know, that's a rosy, lighthearted marker of time, that I prefer to think about most days, than the grim reality of, you know, the sheer number of workers dying, you know, every week, month, and year that the Advisory Board tarries in rendering a decision on this.

And, you know, 2013 that's when the Board, and this Work Group, became aware of the issue with subcontractor CTWs at the SRS. And that's when you all found out that the dose records were maintained separately, there was no verification of completeness, that's eight years.

In 2016, well -- in the last week I went back and reviewed the history of the petition. And in 2016, in discussion about what NIOSH was looking for on bioassay data compliance, or bioassay compliance.

Tim stated on Page, Dr. Taulbee stated on Page 21 of the hearing transcript for September 26th, 2016 meeting, quote, I'd consider success if we're greater than 75 percent, unquote. I'd expect 100 percent on that one, but -- or I don't expect 100 percent on that one, but I do think, I do anticipate that we will have a very reasonable success rate, unquote.

Today we're hearing about 50 percent, or a little over 50 percent, and that's based on incomplete data. On Page 27, and 28 of that transcript from 2016, he provided that after seeing the data set from 773A, which was retrieved from the SRS EDWS system, that quote, so, there are job plans out at the site. Every area had job plans, how they controlled their work. We just felt that this was a very convenient group of records that we could evaluate to make some quick determinations on, unquote.

Quote, I can't see where it would be any different, from this area, versus other areas in this period of time, or at this time period. It was all controlled by DuPont and they did things pretty uniformly across the whole site, unquote.

Mr. Fitzgerald agreed, it was sort of acknowledged that DuPont did ride hard on the subcontractors, he said. And unfortunately, by no fault of anyone, and I'm going to, I'm probably going to say this several times because I feel that our attacks on the site's policies, policy implementation, monitoring,

radiation controls, and records keeping are taken personally when they shouldn't be.

By no fault of anyone here, that assumption was just unfounded, we don't have completeness of data for RWPs, and actual job-specific bioassay data on subs out at the site for the relative time period.

And by the November 2017 meeting, when it became more clear that getting this evidence and showing data completeness was going to be more difficult than expected, NIOSH began to divert everyone's attention from the glaring issue of subcontractor CTW bioassay compliance assessment, in the form of the 1998 notice of violation from DOE showing 21 percent compliance.

They began to divert attention from that by saying, well, you know, those guys are on a routine bioassay sample. Only about five percent were not. And we heard that again today, we heard that in 2018 and 2019 as well.

You know, this 1998 violation since, is spoken about as if it's some sort of distraction from the bigger issue. But the job-specific bioassay data has been the issue from the outside, the outset, excuse me. And can't be understated as it goes to the even bigger issue whether employees were monitored for the specific source terms of concern.

And moreover, as my co-counsel, Mr. Johnson, just discussed at length, this is one of a number of issues, at the Site that we can point to, that illustrate this decades-long systemic issue with monitoring data that are, in part, cultural at the site.

This isn't some sort of one-off, and the Site shouldn't be given the benefit of the doubt concerning their monitoring practices of subcontractors, or any employees for that matter.

At the February 2018 meeting, Chairmen Clawson,

in discussion with Mr. Taulbee, or Dr. Taulbee, about gathering RWPs and subcontractor CTW job-specific bioassays, Mr. Clawson stated, quote, this is our last-ditch effort to try and be able to take care of this. And I want to make sure, if we decide on a path forward, that it is going to accomplish, and it is going to do what we need me to do.

Quote, I don't just want a knee-jerk reaction, spend another year out there gathering stuff, and not get what we really need. And Tim's response was, I totally understand, would it be okay with you, at this time, if we pursued getting more information about those 852 boxes?

You know, as we know by now, you know, that didn't give us the data that we needed. And by the December 29th meeting, even NIOSH can't deny that data is missing. RWPs were destroyed, subcontractor data is missing, misplaced, or has been destroyed, and there's a general acknowledgment of subcontractor CTW records destruction.

And whether at this point, as Mr. Johnson pointed out, they were destroyed, missing, misplaced, it doesn't matter. That's not NIOSH's fault, but we just don't have the data to verify completeness.

And this, essentially, is admitted by everyone at the November 2020 meeting, but I'd like to point out that in December 2019, in response to comments from Warren Johnson, Ted Katz reassured everyone, quote, we're not on an endless road anymore, unquote.

Folks, that was over a year ago, that was December of '19, we're in the second quarter of 2021. You know, we're now -- NIOSH is now asking for that second last ditch to run some new numbers, essentially make up, fathom new data out of thin air, out of averages, through bootstrapping.

And, you know, for reasons previously outlined by

SC&A, and by others, it's just simply not feasible. The only appropriate remedy here then is, which should've been, frankly, granted at least four years ago, is an SEC.

And so, we would -- that, that would be our request that, you know, this SEC be granted. It's long overdue. As Dr. Ringen pointed out yesterday in his comments, you know, anything you'll do is, won't be sufficient because it's taken this long.

But that's our position on this, and I'll leave it to you all or any other folks for public comment.

Dr. Roberts: Thank you, Mr. Johnson and Mr. Fester. And I assume that that concludes your presentation?

Mr. Fester: That does.

Dr. Roberts: Okay. I would like to open it up for questions, or comments from the Board.

Member Clawson: We have none, I have --

Member Schofield: Rashaun, this is Phil. I'd like to make some comments.

Dr. Roberts: I'm sorry, who's speaking?

Member Clawson: Phil.

Member Schofield: Phillip Schofield.

Dr. Roberts: Okay. Hi, hi, Phil.

Member Schofield: You know, I've got a lot of experience dealing with, what we refer to, as hot jobs. And a lot of these things were covered by RWPs, but a lot of hot jobs, quite often, are not.

There's something that needs to get done and needs to get done right now, or it's outside of the RWP because it's not something they anticipated.

And when you're talking about 21 percent, you get

into any abnormal, which is what you would expect from an RWP, you're not doing normal routine things. Whether you bust the window, whether you puncture a glove, whether you have a valve leak, it doesn't matter.

Two guys, working side by side, one can get all crapped up, and the other one doesn't. The other thing is, you can say, well, they had on face masks, but if you bump your face mask at the wrong time, you can get an intake.

And if you don't leave a sample, and particularly, since the rotation of these small contractors was horrendous. They just come and go, you know, some of these people you listen to them and they worked for four or five different contractors in the short time they were there.

It is more than possible, and I would say it is more than likely, some of those people got doses internally that were never documented or found.

Yeah, you can get a higher dose on a lot of these jobs, but any time you're doing anything that's abnormal, the risk of internal exposure goes up, and it doesn't take much if that plutonium, that americium, or whatever it is gets into your lungs, or gets in your blood stream, now you've got a real serious problem.

And, you know, I mean, these are not routine things. And so, that risk, if you do not have good records, if everybody did not leave a sample, that doesn't mean the one who left the sample got the same dose as the guys who did not leave the sample.

And a lot of those guys have said that, you know what, once we got done all we wanted to do get changed and get out there and go home. And I would challenge anybody that's done very many hot jobs to show me where that does not happen. And that's my two cents.

Dr. Roberts: Thank you, Phil.

Member Valerio: Rashaun, this is Loretta. I have a question for Joe Fitzgerald.

Dr. Roberts: Go right ahead, Loretta.

Member Valerio: So, and I couldn't find it, and maybe I didn't look in the right place, but I was trying to find the Tiger Team findings on Savannah River Site. So, I believe Joe said earlier that DuPont, the Tiger Team findings, indicated that DuPont was not managing the bioassay program.

I was just wondering, if in those findings, they indicated how far back that was an issue? I'm assuming it went back to the beginning of time, but again, I couldn't find the Tiger Team reports. I just wanted clarification on that.

Mr. Fitzgerald: Yeah, the Tiger Team results are in a 2000, I think it was in 2000, or maybe it was 1999 report. And actually, the actual citations, the findings on the monitoring is in our Review of Report 92, which you have a copy of.

If you want to take a look through there, you can actually see those findings, but DOE did take some time to evaluate the programs, and this is a year after DuPont left, so these are essentially still DuPont-era programs. Westinghouse did not have a chance to change them.

But certainly, they did identify the lack of accountability in collecting bioassays from workers as a key finding in that review. And corrective actions were to have been taken, but apparently were not successful, and this was a similar issue to what was picked up later.

Member Valerio: Okay, thank you, Joe. And I did read the report, but I didn't make a note of it for some reason. So, the monitoring that they did identify was more for routine workers or did that include, I'm assuming that it also included the job-

specific monitoring issues, is that correct?

Mr. Fitzgerald: It was, yeah, it was both. It was a general finding on ensuring that workers submitted bioassay samples, and the fact that when workers did not, management did not hold them accountable and eventually just allowed those samples not to be collected.

So, again, it's a pretty significant finding. The other major finding that we highlight, excuse me, the other major finding that we highlighted was the lack of facility characterization for what source terms you would identify in an RWP.

If, in fact, there was a -- when you developed an RWP, you would need to know what nuclides to monitor for. And that was a finding by the Tiger Team that there was not a, essentially, a systematic system in place that would identify those source terms. So, that was another finding by the Tiger Team.

Member Valerio: Okay, thank you, Joe. And I have one more quick question, and this one is for Tim Taulbee.

Dr. Taulbee: Yes, ma'am?

Member Valerio: So, I believe you said earlier that the work permits identified radionuclides that were potentially of concern during the project, or the job, or whatever. Do you know, in NOCTS, were there any notations, maybe in the CATI reports, that the workers encountered radionuclides that were not listed on the work permits?

Dr. Taulbee: We did not look from that level of detail within the NOCTS dataset, basically what you're asking there. Savannah River has a base set of radionuclides, and that's the nine co-exposure models that we have in OTIB-81.

And so, we looked across those particular radio -- that particular monitoring set in a global, large, a

more coarse scale, than what you're talking about. So, I guess the answer would be, no, we did not look at it from that standpoint to see if there's anything in the CATIs that was not covered on the RWPs.

In general, the different areas that we were sampling from, you get plutonium in the plutonium area, americium in some of the A areas, and, you know, uranium in M area, and so, it was really more separated by the process areas and the known radionuclides in those areas. Does that help?

Member Valerio: Yes, it does. Thank you.

Member Ziemer: Rashaun, I'd like to make a comment too.

Dr. Roberts: Okay, sure.

Member Ziemer: Am I good to go?

Dr. Roberts: Yes. I was just going to state that --

Member Ziemer: Okay, just a couple comments. I should probably preface this by saying that I fully support the report of the Tiger Teams, and, as well as the earlier reports from DOE that led to some of those finds in the late '80s.

We should also keep in mind that the -- all of those things dealt with the adequacy of protecting the personnel at the time. That is, the Health Physics Radiation Safety Programs were inadequate. That, in itself, does not inherently mean that you can't do dose reconstruction.

It may indicate something about the inadequacy of the dataset, but one the reasons we're dealing with coworker models is the very fact that we lack some of this information; in some cases, a lot of it.

So, the question, I hope we're not simply influenced by the fact that there were legal issues and fines, but ask ourselves are the data -- the data that is

available, is it adequate -- sorry, my clock is chiming in the background, maybe that means to quit talking, but -- okay it has stopped.

In any event, we have this in many cases whether or not there were legal issues and so on, we always have the fact, particularly, going back where we don't have as much data as we would like, the adequacy of the data, in part, is the question of whether or not we can, correctly, do a coworker model?

And I hope everyone is clear, including the petitioners, that a coworker model doesn't mean we're matching one person against one other person. The coworker model is taking data from many, many workers, and trying to find the upper bound of the data that we would assign.

Typically, it is way more -- I say typically, there could be a very occasional exception -- typically, it is a bounding data much, much higher than the assigned data that an individual worker would typically get from their own data.

Particularly when we select the upper 95 percent of the distribution for assigning it. So, keep those two things in mind as you think about whether or not, particularly though the '80s, or late '70s and '80s, whether there is sufficient and adequate data for dose reconstruction.

Member Lockey: And Paul, to follow up with -- Jim Lockey. I didn't see any data that -- any objective data -- that indicates that that is not true.

In other words, I kept looking at areas that, is there something, something that's falling out of this, there's something that doesn't make sense. Is there data that we have that is, doesn't match all the other databases we have in this particular co-work to indicate that we are missing something, that's not covered by the 95 percent confidence levels. And I haven't seen that, and I don't know if that

exists, and I haven't seen it, but haven't seen it.

Member Clawson: Well, and I --

Member Ziemer: And I'll make one other comment on that. I hope it's clear that NIOSH is not making up numbers out of thin air. There is a methodology that is intended, certainly, to be claimant favorable. One could argue -- and Tim, you're not restricted to the NOCTS data in terms of establishing a coworker model certainly?

Member Lockey: No, no.

Dr. Taulbee: That is correct, we are not. And, in fact, thank you for bringing that up. We use the NOCTS data because it is easier to use and convenient, but we have all of the data physically, all, from all of the log books, it has not been coded. We've only used the NOCTS data for the plutonium and for the tritium.

And for the tritium models -- and keep in mind there's 140,000 data points that we have. So, you know, we could get more, we can go to the log books and get more, but we don't think that it's necessary.

Member Clawson: Well, and that all being said, and I know, Lockey, your mindset there, you're looking for red flags up there and stuff. I guess the 70-about-9 percent incomplete gives a pause for coworkers.

I think that data may assume that, you know, that's kind of a bad thing. But if data is missing, how can we possibly know what exposures are out there? We don't, and that's the issue. We're having to draw a lot of lines, and everything else like that, but you know what this comes down to, is we've got on our plate here to be able to, to vote --

Member Lockey: I'm -- Brad --

Member Clawson: What.

Member Lockey: Brad, what I'm looking for is at least some circumstantial, objective, evidence that what NIOSH is proposing is not true. So, I went back and looked at the Westinghouse citation. And he came back level two, I'm not sure what level two means, you probably know better than I do.

But I looked at that citation, and if Westinghouse went back and looked at those 256 people, and five of those people, or 10 of those people had internal dosimetries that were significant, that would be the end of the story for me. But none of them did, Brad. None of them did.

And then they went back, they were going go back another year, but they said based on where these people worked, and our 100 milligram cut off, none of them worked at a job task where they had that.

And so, I'm not saying that, says that's the way it was back in years previously that, but the way I approach this database is, is there something wrong with the database that indicates it may not be true. And I just don't have that data, Brad. I know there's data missing, I know that, I understand that. But I don't have any indication that the database as presented is not true, I wish I did.

Member Clawson: What about the '70s and 80's?

Member Lockey: I didn't like the '70s, okay.

Member Clawson: Hallelujah.

Member Lockey: I told you that.

Member Clawson: I realize that this is all circumstantial, this is what the issue is.

If we had all the information, we wouldn't be here. If we had all this.

Member Lockey: The data from '73 up through '78, '79, to me, is, there's not enough data points to make any opinion about that data, and I wouldn't

rely on that data, I really wouldn't.

Member Clawson: Well, I'm telling you what I feel, and that's that, we're being asked to infer, or deduce completeness. And I don't think that we are. With that being said, like I said before, everybody's got their own vote, everybody can go the way that they want.

The thing is, is we've got to get this taken care of, because if it doesn't go the way, that's fine, but we can all vote.

Member Lockey: I'm with you, Brad. We got to take care of it, not let it go on after today.

Member Clawson: Okay.

Member Lockey: I mean, I don't want any more delays here because I think, from my perspective, the issue for the Board is how good is this data? I think the data is pretty good from '80 on, I don't like the data in the mid '70s because I think it's deficient.

But I think the data is good from the '80s on, and I haven't seen anything that SC&A has presented that is objective data that indicates it's not valid, and that's my problem.

Member Beach: Jim, could I ask you a question? You said the '80s, give me a time frame in the '80s you're thinking of.

Member Lockey: '73, '74, '75 --

Member Beach: No, no, no, I know that's where you don't agree, but when do you think the data got good in the '80s?

Member Lockey: I think 1980. I looked at the data --

Member Beach: Oh, 1980. Okay.

Member Lockey: Yes, that's what I'm thinking

about. I mean, I like, the data before that to me is, you know, the numbers are small, and the data we have from the job tests are small. There's just not a lot of data that I would feel comfortable in.

I would never put that in a database and do any statistical analysis because the numbers are too small. The more recent data, like the tritium data, that's a huge database, and I was surprised that their exposures were less than the prime contractors.

I was thinking that they were going to be higher, and that would answer my question, but they were lower. Now there might be a reason for that, but if they were higher, I would just assume that was the subcontractors and contractors are different groups, and the prime contractors do not represent what the contractors were doing, they were lower.

Member Anderson: But the tritium is only in certain areas, I mean, you don't know about the workers in the other areas. That's, I mean if you look at the tritium data, they can see that over the years it's really come down --

Member Lockey: Let me ask you a question.

Member Anderson: -- which some say was higher in the past.

Member Lockey: Let me ask you a question. If it were to come out to reverse, would you be saying the same thing? No, you would have been saying that proves that the subcontractors were different than the contractors.

Member Anderson: Well, no I mean the idea is it adequate for the subcontractors, for all of the jobs they did? Not just the jobs they did in certain, you know, Building A. My issue is you got Building A and yes that's the plutonium areas and that addresses the plutonium things, but not the other, and so it's a complete -- I go back to the completeness issue,

is how complete is the data? And when do you think the data is complete for dose --

Member Lockey: I go to the consistency of the data, and all the data is consistent. Hundreds and hundreds of data points are consistent across the years. If I would have seen any inconsistency, Andy, any, if I would have seen Westinghouse go back and look at those 258 people and say, 10 percent of them have doses that weren't recorded that are significant, that's the end of the story for me.

If I would have seen the tritium much higher than the prime contractors, that would have been the story. But that's not the case. Those results are consistent with everything else.

Member Anderson: Yes, I mean 1997 is, that's beyond our area of consideration. That's where it was all good. I mean they had done what they could, and a lot of improvements, and the measurements in following back on those people how does that talk about those where the tritium levels were higher?

Member Lockey: But all the data is consistent, Andy. It's not inconsistent. It's consistent. I know there's reasons for each little data point, you could grow problems with it. But they had the NOCTS data in a population that is at risk or is being seen because they have cancer, as reflective of a higher exposure level. You know, that's a very powerful population to look at.

Member Clawson: Well, that being said, Rashaun. I don't know how you want to do this, but I've got a, Knut Ringen was no longer able to keep with us and you made a comment earlier. Rashaun, do you want me to just read what Knut wanted read into the record?

Dr. Roberts: Yes, but -- can I just check in with other folks? I know David Richardson has had his

hand up for a little bit.

Member Ziemer: Yes, is Knut's a public comment thing? Because we don't have public comments today.

Member Clawson: Well, we just -- he's part of the petitioners. So, I kind of think that's pretty good.

Member Ziemer: Oh, he, okay. I'm sorry, I forgot he was part of the petitioners.

Member Clawson: So go ahead, Rashaun.

Dr. Roberts: I'm sorry, I missed the question about the petitioner.

Member Clawson: He's been part of the petitioners for the last several years. I just wanted to make sure this got read into the record. He was -- had to go to another meeting and sent this.

Dr. Roberts: Okay.

Member Lockey: Rashaun, Jim Lockey, I have to step away for five minutes, okay? I'm sorry. Just continue.

Dr. Roberts: I'm sorry, I can't tell who's speaking? Was that Jim Lockey, Jim?

Member Lockey: Yes, I got to take this phone call, I'll be away for five minutes, but then --

Dr. Roberts: Oh, I see. Okay, but yes I did want us to just circle back around really quickly, because I know Dave R. had his hand up for a little bit, and just see if there are any remaining questions or comments, before we move on.

Okay. So one question I have is, do the people just feel like this has been discussed fairly well at this point? Do people feel like they have, you know, the answer to any questions they may, that might be lingering?

Member Beach: Yes, I feel like I have everything I need after today.

Dr. Roberts: Okay. Now, Brad, since you, I'm sorry things were cutting in and out. So, you said you had something you wanted to read into the record?

Member Clawson: Well, Rashaun I sent it to you on your phone. It was just a comment, it was a comment that sent by Knut Ringen. He's been involved with this from the very beginning for the petitioners. And I just wanted to read this in, because I told him that I would.

Dr. Roberts: Okay.

Member Clawson: Brad, I would like to be able to -- I will not be able to participate any longer. In response to Lockey's comment about cancer and dose response, we have published several peer review reports showing that construction trade workers in DOE facilities have sufficient, higher of cancer associated with rad. Exposure to production -- exposures that production workers suggest indicates higher exposure.

The EEOICPA claims data that Tim indicates are not representative of everything. They have been as many -- there have been as many construction trade workers in DOE facilities as production workers. But they represent only 20 percent of all the claimants.

And I sent this to your phone, Rashaun, because I didn't know how you wanted to be able to do it. But everything being said, I would like to just remind everybody what the proposed Class is. And I'd like to be able to get this to a vote. So, my question is, is I'd like to be able to post up here, Bob, if you could post up what the Class Definition is.

This is the proposed Class Definition that we had have had. This is the same thing that we proposed

to you earlier. I think that -- and like I say, everybody has their own vote, everybody has their own feelings on this. I just want to bring this before the Board, I want to be able put this up there, and I move that we vote on this Class Definition for an SEC.

And I think I've already had a second. I don't know, Paul. Do I have to completely redo it again or what?

Member Ziemer: No, I think the motion has been before us since we started the session. And what we've had is a discussion, which one could interpret as in support of or not in support of the motion.

So, I think we're fine.

Member Anderson: We can call --

Member Ziemer: I think --

Member Anderson: Call the question.

Member Ziemer: I think Rashaun has to chair it though, I don't think the Chairman of the Work Group can chair his own recommendation.

Member Clawson: There you go, sounds good.

Member Anderson: But we can call the question, Paul.

Member Ziemer: Oh, yes.

Member Beach: This is -- Rashaun, this is Josie. I would suggest that you maybe read the proposed Class for those on the line that can't see that.

Dr. Roberts: Yes.

Member Beach: It wasn't real clear earlier. Thank you.

Member Ziemer: Good point.

Dr. Roberts: The other thing though is that I did get

a couple of notices of folks needing to step away. So, I think Jim, may still be on his call. And then David Richardson sent something saying that he needed to step out.

So --

Member Lockey: Jim Lockey, I'm back.

Dr. Roberts: Oh, you're back, okay. And David, are you back yet?

Member Kotelchuck: If people have to step away, then I think it's more important to get the vote while everybody is here. And you might just ask people on the phone, if they need the Class Definition read again. If they do, you'll read it of course. But they may not need it.

Member Ziemer: While this is up, do we know if -- has counsel looked at this also for applicability -- or not -- whether it can be carried out by labor?

Member Clawson: That doesn't even play in until after the vote.

Member Ziemer: Okay, thanks.

Member Clawson: And we've -- we've dealt with construction workers like this. This is boilerplate to it.

Member Ziemer: Okay.

Member Clawson: That we have dealt with at Hanford and every other place.

Member Ziemer: Okay.

Ms. Naylor: Okay, just a point of clarification. For those two examples that you -- well, for Fernald and Hanford, we did check with DOL ahead of time, before the Class Definition was voted on.

And that actually took place behind the scenes between Ted Katz and Dr. Melius. And so it's that

those were -- have been done previously before the Board actually voted on them.

But I think this Class Definition, we haven't presented that to DOL, and I do have certain concerns about the wording here, because this actually is not boilerplate. We've never done excluding employees of the following prime contractor language, previously.

So, I am a bit concerned about this. I think --

Member Clawson: Hanford. Hanford, this is the exact same thing.

Ms. Naylor: So, I think what we could do is, if the Board would vote with the understanding that the wording of the proposed Class Definition may change, and perhaps a second vote would need -- have to take place.

Member Beach: Jenny, this is Josie and I would just like to step in and say a couple things. First of all, this Class Definition was posted several meetings ago, so there was ample time. But with that said, understanding that our Board is under a different circumstances without having a Chair, I can see why that may have gotten missed.

So, I feel it is okay to move forward without changing -- with changing the wording potentially, but not changing the actual definition of the class. So, I feel like it would be fine to move forward, unless I'm missing something.

Dr. Roberts: But I would say that the caveat is that when this does go to DOL to see if it's able to be administered, you know, we may need to come back around and do some work on it.

Member Clawson: And that's fine. If there's a big issue like that then we've always -- we've always dealt with that.

Member Ziemer: And I think the intent of the

motion is fairly clear even if we have to massage it a little bit to make it work.

Member Beach: Right.

Member Clawson: As we have in the past.

Dr. Roberts: And just to clarify my understanding of this is that it was kind of a strawman and kind of a work in progress. So that may have been a misunderstanding on my part. But at any rate, we're where we are and we can just -- we can forward.

Member Ziemer: Right.

Member Clawson: Okay.

Dr. Roberts: So the question is are there folks who would like me to read this?

Member Clawson: Why don't you -- Rashaun, why don't you just read it just for everybody? Just so we don't miss anything.

Member Ziemer: Okay.

Dr. Roberts: Okay, let me see if I can -- it's really small on my screen. I'm going to have to adjust something, if you'll just give me a minute.

Okay, so the proposed Class Definition is, "All construction trade employees of Department of Energy subcontractor -- that's subcontractors, and there's a parenthesis -- excluding employees of the following prime contractors who worked at the Savannah River Site in Aiken, South Carolina during the specified time periods, E.I. du Pont de Nemours and Company, October 1st, 1972 through March 31st, 1989; and Westinghouse Savannah River Company, April 1, 1989 through December 31st, 1990, who worked at the Savannah River Site from October 1st, 1972 through December 31st, 1990 for a number of work days aggregating at least 250 work days, occurring either solely under this

employment, or in combination with work days within the parameters established for one or more other classes of employees included in the Special Exposure Cohort."

So, any discussion of this proposed Class Definition?

Ms. Naylor: Rashaun, this is Jenny. Just a point of clarification. So, the sentence -- or the first two lines here, it specifically talks about subcontractors, but it is excluding employees --

Member Beach: Jenny, just -- Jenny, just a second. Rashaun, can you mute, because she's -- thank you.

Okay, go ahead Jenny, sorry.

Ms. Naylor: Okay. So, just a point of clarification I want to make sure that it's intentional. For instance, the first two sentences say all construction trade employees of DOE subcontractors. But then the parentheses is actually excluding employees of the prime contractors, which is a very different approach from the Hanford definition -- bio Class Definition out of Petition 226.

So, I just want to make sure that we are setting this up as a subcontractor Class, but then we are specifically excluding employees from the prime contractor, even --

Member Clawson: That's true.

Ms. Naylor: -- the actual definition there does not include contracting, only subcontracting, does that make sense?

Member Clawson: That is correct, because we only have a petition from the subcontractors.

Ms. Naylor: And so excluding employees from the prime contractors, is the Board's intent to specifically exclude them even though they're not included in the petition to begin with?

Member Clawson: Just like what it was in Hanford, was construction trades.

Ms. Naylor: Okay, to --

Member Clawson: We were going to all the construction's subcontractors and we called out --

Ms. Naylor: Okay, to be sure --

Member Clawson: -- Rust and everybody else.

Ms. Naylor: Okay, to be sure the Hanford Class Definition includes contractors and subcontractors, and then you go on to exclude certain employees of the prime contractor. But here I just want to make sure that not only that this Class is specifically for subcontractors, but we're also intentionally excluding employees from the prime contractors. So if this is the specific intent, that this is not a mistake or not a word just missing, then --

Member Clawson: This is not. We are excluding the prime.

Ms. Naylor: Okay. Thank you for that clarification.

Member Clawson: Okay.

Dr. Roberts: Any other comments or discussion about this? And does everyone on the Board, you know, do you grasp this definition?

Member Roessler: Are we open to discuss the motion or are we going to discuss the next step?

Dr. Roberts: Yes, this is the discussion piece.

Member Roessler: Okay. I would like to make a comment -- a couple comments. I just wanted to indicate ahead of time that I'm going to vote against the motion. I'm convinced that NIOSH can do dose reconstruction. Particularly on the information today.

I thought the summary of their procedures and the

clarification of their database was well done. It addressed some questions I had. And I especially was convinced by their specific response to all of the SC&A areas of concern.

Also I think supporting my decision has come based on comments from other Work Group and Board Members. I do want to add though if the vote on this is not unanimous, whichever way it goes, I hope that kind of information does go to the Secretary. Because we really don't -- don't seem to be very unified on this one way or the other. And also I think the Secretary should know that NIOSH feels they can do dose reconstruction.

And I'll make one other comment that has sort of bothered me throughout this whole SRS area of discussion, and that's the one paragraph in the letter that usually goes to the Secretary. It says -- let's see if I can -- yes, it does say -- typically say, the Board determined that health may have been in danger for these -- and in this case, we'd say SRS workers.

And my conscience kind of bothers me a little bit if -- to be a part of the signature on a statement like this. In this particular case, the doses are so low that I really have a hard time myself saying that I think that at those doses their health may have been endangered. And that's the end of my comments.

Member Ziemer: If I could respond, just on that last part, Gen. I think the legal requirement if an SEC is supported by the Board, the legal requirement is you have to have a finding that health is endangered. Otherwise, you can't recommend an SEC.

So if one is voting for this, you also have -- I mean, Tim you can -- or maybe Grady can clarify that, but I think there is a requirement that you would have to -- the Board would have to say that health is endangered if they make such a recommendation.

Member Roessler: If I were to vote against it, then I don't have to be bothered by my concern about that comment? Is that what you're saying?

`Member Ziemer: Well, I'm just saying, I believe there's a legal requirement. Maybe either Tim or Grady can clarify that.

Ms. Naylor: This is Jenny again --

Member Ziemer: You can't call for an SEC and say that unless you say that health is endangered.

Dr. Taulbee: Jenny, you were going to say something?

Ms. Naylor: Yes, so Dr. Ziemer is correct that under EEOICPA statute that the Secretary had to find that, "it is not feasible to estimate with sufficient accuracy the radiation dose that the worker has received," so basically we have to identify what that dose is that cannot be reconstructed.

And it goes on to say that, "there is a reasonable likelihood that such radiation dose may have endangered the health of members of the Class." So it's the dose that you cannot reconstruct, it's also the dose that can cause -- that may have endangered the health of a member of the Class.

And in the SEC regulations we have defined that health endangerment is to mean exposure to under 50 days. And so then you see that part of the Class Definitions talks about the number of work day aggregating to at least 250 work days.

Does that explain that?

Member Roessler: Jenny, I'm sorry, I guess it's my hearing problem. But I didn't really hear what you said. But when I looked at this again I think maybe I can justify my conscience on this because the statement does say that health may have been in danger. Maybe that word is enough in there that I could live with it, if it goes through like this.

Ms. Naylor: Yes, and lastly, just also that when you're voting against this Class Definition, you're also voting against the proposition that this dose is high enough that in the aggregate of 250 work day is necessary to harm the workers.

And so I think your one vote against the Class Definition including those two parts -- you know, the identification of the Class of workers plus the 250 work days -- would sort of I think state your objection on the record.

Member Lockey: So this is Jim Lockey, I didn't understand that. Does that mean if you don't think the dose was a level that represents a health endangerment, what does that mean?

Member Ziemer: Jim, I think it means, essentially if you say you can't reconstruct the dose, in essence you're saying, we don't know what the doses were. But if they occurred from -- and this becomes a very arbitrary part of the law I think, but it is what it is.

It's a part of where science intersects with public policy, and the policy is that if the exposure occurred for at least 250 days, whatever it is, then you pass some kind of imaginary threshold where endangerment may have occurred.

Member Lockey: Well, that --

Member Ziemer: That's about as arbitrary as you can get. But that's the law I think.

Ms. Naylor: Yes, so the reason --

Member Anderson: Aren't there a lot of -- there are thousands of cases in the NOCTS database. Have any of them been awarded?

Member Lockey: Yes, 300 -- 3,100 are in the --

Member Ziemer: Well something like $1.6 billion to the site.

Member Anderson: Yes --

Member Ziemer: Now, that's not all -- that's not all construction workers.

Member Anderson: No, but I mean in the -- there's construction workers in the database --

Member Ziemer: Sure.

Member Anderson: -- that have been compensated.

Member Ziemer: Sure.

Member Anderson: So that would be -- I would assume that's an endangerment.

Member Ziemer: Exactly.

Member Anderson: So, I mean it's kind of a moot point that they have had dose reconstructions done on them. And they were awarded.

Member Ziemer: Right.

Member Roessler: So Henry, I think what you're saying in this particular situation, that comment is true. And I can go with that.

Member Anderson: Yes.

Member Ziemer: That is true.

Member Clawson: Okay, Rashaun, it's yours.

Dr. Roberts: Okay. I also wanted to check in -- and Brad I don't know if you have this on another slide or anything. But just to get a very clear articulation of the technical basis. I know that we've talked about a lot, I just want to --

Member Clawson: You mean the feasibility statement? Is that what you're looking for?

Dr. Roberts: The basis for the proposed Class, adding the proposed Class.

Member Clawson: Yes, we've got a feasibility statement. And we've also got a Class Definition implementation too.

Dr. Roberts: Okay. So is everybody clear on the technical basis, do we need to read that?

Member Clawson: There you go.

Ms. Naylor: Brad, would you mind reading that into the record?

Member Clawson: What's that?

Ms. Naylor: Would you mind reading that --

Member Clawson: I'll have Rashaun read it in, thank you, Jenny.

Dr. Roberts: Yes, I'm trying to increase my screen again, sorry. It's going to take me a minute so I can do that.

Member Anderson: While you're looking at that, I would just point out that that's way more extensive than we've ever provided the Secretary in the past, if this is approved.

Member Kotelchuck: Yes.

Member Anderson: We usually have two or three brief bullets.

Member Kotelchuck: Yes.

Member Anderson: I would be hopeful if the --

Member Clawson: Well, we want to really --

Member Anderson: If the petition passes, I would be hopeful that we could condense this considerably.

Member Clawson: Well, you knew we don't have to worry about this until after the vote, but --

Member Anderson: Oh, I understand. I understand.

(Simultaneous speaking.)

Member Clawson: For some reason the scientific --

Member Anderson: I was just saying --

Member Clawson: Right.

Member Anderson: I said if it passes, then we can worry --

Member Clawson: Right.

Dr. Roberts: Okay. I think I've got it to where I can try to read this. Okay. So the -- okay, feasibility statement for ABRWH consideration for this meeting.

Feasibility of dose reconstruction findings. "This current evaluation of Petition SEC-00103 proposes a Class that begins on October 1st, 1972 and extends through December 31st, 1990.

The Advisory Board on Radiation and Worker Health finds there to be insufficient information, including job-specific radiobioassay monitoring data for subcontractor construction trade workers, and workplace monitoring and source-term data to allow it to estimate with sufficient accuracy the potential internal doses from radionuclides associated with fuel handling, reactor operations, fuel reprocessing or research activities to which the proposed Class may have been exposed during the period from October 1st, 1972 through December 31st, 1990.

NIOSH finds that it is likely feasible to reconstruct occupational external dose as well as medical dose for Savannah River Site subcontractors with sufficient accuracy.

The ABRWH Dose Reconstruction Feasibility Findings are based on the following points."

First bullet, "Subcontractor construction trade workers conducted a broad range of work activities

supporting research, fuel handling, transuranic material processing and separation, decontamination and decommissioning, and reactor outages including work in high contamination and high airborne radioactivity areas."

Next point, "Principal sources of internal radiation exposure for members of the proposed Class included radionuclides such as isotopes of uranium, thorium and plutonium, neptunium-237, americium-241, tritium, and mixed fission and activation products."

Next bullet, "Subcontractor construction trade workers were sometimes considered transient in that they may not have worked for long periods at SRS, may have been intermittently tasked with non-routine radiological jobs under work permits and thus were not likely enrolled in the routine, including termination bioassay monitoring program, and should have been monitored."

Next point, "Contemporary interviews with subcontractor construction trade workers including Computer Assisted Telephone Interviews indicate that some contractor construction trades workers may have been utilized for short-term high exposure work tasks to save on the potential radiological exposures to in-house prime contractor personnel."

Next point, "Deficiencies in the conduct of permit-driven job-specific monitoring were noted by SRS and DOE as late as 1997, for example 79 percent bioassay incompleteness."

Next point, "The ABRWH has determined that insufficient information exists to establish the completeness and representation of job-specific bioassays, for at least the time period from 1972 to 1990. The Board recommends a cutoff of the Class Definition for December 31st, 1990 in recognition of the lack of specific internal exposure information concerning the conduct of job-specific monitoring

that persisted until at least the end of that year."

I'm going to have to pause right there because I can't see the rest of this. Okay, let's see, and the last bullet.

"The ABRWH finds that the completeness and representation of subcontractors who were or should have been monitored via the permit-driven job-specific monitoring program has not been sufficiently established. Therefore dose reconstruction for unmonitored subcontractor construction trade workers who should have been monitored via the permit-driven job-specific monitoring program are not feasible using current co-exposure models developed by NIOSH."

So that was a mouthful. Okay.

Member Beach: There's another page.

(Laughter.)

Member Beach: Yeah, I think there's a second page there.

Dr. Roberts: Okay, I can see it, sorry. Okay, alright, so three paragraphs on that page, right? Am I cutting anything off?

Member Beach: Nope, that's three on the last page.

Dr. Roberts: Okay so this is the last bullet.

NIOSH has determined that available external monitoring data may be used in accordance with existing procedures on a case-by-case basis for the purpose of partial dose reconstructions.

NIOSH has also determined that adequate reconstruction of medical dose is likely to be feasible by using claimant-favorable assumptions in the technical information bulletin, Dose Reconstruction from Occupational Medical X-ray Procedures.

ORAU-OTIB-0006 and the SRS site Profile documents pursuant to 42 CFR 83.3(c)(1), the ABRWH determined that there is insufficient information to either, number one, estimate the maximum radiation dose for every type of cancer for which radiation doses are reconstructed that could have been incurred under plausible circumstances by any member of the Class. Or two, estimate the radiation doses of members of the Class more precisely than a maximum dose estimate.

All though the ABRWH found that it is not possible to completely reconstruct radiation doses for the proposed Class, NIOSH intends to use any internal and external monitoring data that may become available for an individual claim, and that can be interpreted using existing NIOSH dose reconstruction processes or procedures. Therefore dose reconstructions for individuals employed with subcontractors during the period from October 1st, 1972 through December 31st, 1990 but who did qualify for inclusion in the SEC, may be performed using these data as appropriate.

Member Clawson: Okay.

Dr. Roberts: Is that all?

Member Beach: Yes, I think so.

Member Clawson: Yes.

Mr. Calhoun: This is Grady, can I, I'm not making any recommendation here or anything. I just want to just note something for you.

As written, since we're saying all internal cannot be reconstructed -- somebody's got to mute their phone. But since we're saying all internal cannot be reconstructed without data, I think we all know there's a lot of tritium data but we mostly discussed americium. But since you say all, that means that we can't use any coworker models for the people

who don't qualify under the SEC.

Again, this isn't a recommendation, this is just a note. If it was limited to americium, the same population would be covered, but we would be able to assign dose with coworker studies to people who didn't qualify under the SEC.

For example if somebody has lymphoma, leukemia, or lung cancer, or a combination of all of those and only worked for ten months, they can't get into the SEC. If they weren't monitored, we can't assign dose. But if it was limited to one of the other nuclides, we could assign dose based on a coworker study.

Member Clawson: Well, Grady --

Mr. Calhoun: No recommendation, I just wanted to point that out.

Member Clawson: Okay, well Grady, I just wanted to point out we used the boilerplate NIOSH claim language, but we can take it out. Why just americium-241?

Mr. Calhoun: I don't -- that's up to you. You guys were talking about it. I just wanted to point that out. That's all.

Member Clawson: Okay, well, we've just used NIOSH's language so I thought we were pretty good on that one there. But, you know, if we need to -- but here's the thing. Is this whole thing right here, now we're getting back to what you talked about earlier, Rashaun. This is our first attempt at it.

The whole thing is, is usually we don't even have to go into this unless we're, unless we've already voted on this. The whole thing is, we need to get this to a vote before any of this even really matters. It may not pass, and it may pass.

But the thing is, is we've got to be able to vote on this. Bob, do you have any thoughts on the

statement that Grady said?

Mr. Barton: Well again, as Grady pointed out, sort of for informational purposes, I will say that, you know, based on the review that SC&A has done, I think americium would certain a worst actor, so to speak. And Grady is correct that if it's all internal, then all those co-exposure models are no longer applicable to workers who don't qualify for the SEC. All that is correct.

However, I think the infeasibility here, for your consideration, the infeasibility was the job-specific bioassay program. So, if that's the infeasibility that is voted on by you all, then I think all internal might, is appropriate. Because the deficiency, the infeasibility is with those job-specific bioassays, which wouldn't be restricted necessary to a specific radionuclide.

Member Clawson: Mm-hmm.

Mr. Barton: But Grady points out there's a lot of americium and I agree with that. It's probably the worst actor out of the ones that were able to be evaluated, specifically in Report 92, which was the report that looked at the RWPs and the subsequent monitoring, whether it was routine or not.

Americium was the most problematic, however, it's the deficiency, the infeasibility is determined to be the job-specific monitoring program as a whole, which I would contend is the only Class of workers generally, because they were under abnormal circumstances and weren't routinely monitored. And it's a problem with the internal bioassay program, not necessarily restricted to americium.

I don't know if that clarifies or answers the issue.

Member Clawson: Well, and also too, you know, we're kind of in a different situation here, because this is usually always being done by NIOSH in their ER review. And the Board needs to play with the

language to the Secretary a little bit, so be it, then that's fine.

But the whole thing that we're voting on is the SEC. We've put the feasibility out there. If we need to tweak with that, then that's fine. But I feel, Rashaun, that we need to get this voted on so that we can continue on.

Dr. Roberts: Okay. Are there any remaining questions or comments about either the Class or the technical basis that's been presented, or any concerns?

Okay, well, I'm hearing none. Let me just, I know there were Board Members that, you know, had stepped out. I think Lockey is back, Jim is back with us, I want to say. And the other person was, oh, David Richardson. Are you back with us, David?

Member Richardson: Yes, I am.

Dr. Roberts: Great, great, great, great. Okay, so Dr. Ziemer you can correct me if I'm wrong. But, you know, we've already made the motion for this. We've had discussion, you know, it seems that people have enough information at this point. So, at this point, I am thinking we can go ahead and do the vote.

Member Ziemer: Yes.

Member Clawson: I just, Rashaun, this is just Brad, I just want to clarify what the vote is. Can you mute your phone for a second, Rashaun?

Dr. Roberts: Oh, yes, sorry.

Member Clawson: A vote yes is for the SEC. A vote no is for no SEC. I just wanted to make sure that we understood what we're voting on.

Member Kotelchuck: Sure.

Member Clawson: So Rashaun, I'll turn it over

Dr. Roberts: Okay, and let me find the grid so that we could do the vote. And I think, Brad, I think you vote last. Let me -- let's see. Let's see, okay.

Member Clawson: I what?

Dr. Roberts: So, I think you may be, since you're Chair of the Work Group, I want to say that you vote last.

Member Clawson: Oh, I was going to say we usually do it by the same way we take the roll, but that's fine.

Dr. Roberts: Okay, either way.

Dr. Roberts: Okay, so let's start with Anderson.

Member Anderson: Yes.

Dr. Roberts: I'm sorry, you said, yes?

Member Anderson: Yes, yes.

Dr. Roberts: Okay.

Member Anderson: I think the data is inadequate.

Dr. Roberts: Okay, Josie.

Member Beach: Yes.

Dr. Roberts: Bill.

Member Field: Field, right?

Dr. Roberts: Yes.

Member Field: Yes.

Dr. Roberts: That was a yes?

Member Field: Yes, that was a yes.

Dr. Roberts: Okay, Dave K.

Member Kotelchuck: Yes.

Dr. Roberts: Jim Lockey.

Member Lockey: No.

Dr. Roberts: Okay. Dave R.

Member Richardson: Yes.

Dr. Roberts: Gen.

Member Roessler: No.

Dr. Roberts: No?

Member Roessler: No.

Dr. Roberts: Okay. Sorry, I'm having trouble hearing, Phil.

Member Schofield: Yes.

Dr. Roberts: Okay, yes.

Member Schofield: Yes.

Dr. Roberts: Yes, okay, that's for Phil. And Loretta.

Member Valerio: Yes.

Dr. Roberts: Ziemer.

Member Ziemer: No, no.

Dr. Roberts: No, okay and then Brad.

Member Clawson: Yes.

Dr. Roberts: Okay, so I think we've got a vote for everyone. And I've got one, two, three, four, five, six, seven, eight yes, and three no, by my count. So, it would appear that the Board has voted for yes. The Class should be added.

Okay, so given that there are a few loose ends to this, and like I said earlier, you know, obviously we're going to need to contact DOL, or some contact needs to be made with DOL to figure out

whether or not the Class can be administered. And, you know, on the technical basis it sounds like some things need to be clarified or taken out of that.

So, I think in our next meeting, typically there's a letter that is read into the record, you know, at that point. But just kind of be warned that there may be some adjustments and things that we need to make to this.

So, I think pretty much does it.

Member Beach: Rashaun, I have a question.

Dr. Roberts: Yes.

Member Beach: Moving forward, who will, who's going to work on this to clarify?

Dr. Roberts: That would seem to be a combination of the Work Group, myself, I can certainly reach out to DOL and see about the administrability of the Class and kind of get some clarity around that.

So, as far as, for the immediate that's what we can do to move forward.

Member Anderson: At the last meeting, didn't Grady volunteer that NIOSH would also help with the definition?

Mr. Calhoun: I did.

Member Anderson: Yeah, okay. I'm going to hold you to it, Grady.

Member Ziemer: I should point out that there was some objection from the general public about Grady doing that. I think it's okay in the sense that NIOSH can help with the issues relating to how it could be administered effectively through the Department of Labor.

Member Anderson: Yes, that is what I'm meaning.

Member Ziemer: So, I believe Terrie Barrie was

concerned about that, or maybe it was someone else.

Member Anderson: No, it was Terrie Barrie.

Member Ziemer: I think the point is, it's not for NIOSH to develop the definition so much as to make sure it's one that can be administered.

Member Anderson: Yes.

Member Ziemer: So, I think to me it's appropriate. And also I'd like to say that I think that from the Board's point of view, I don't think we, I think we could handle the rest of this on the next phone call meeting rather than the regular two-day meeting.

It's going to be a matter of getting the right wording, particularly if counsel has some changes or paper, how, some administrative changes. And then as I said before, I would hope that the feasibility statement could be considerably shortened.

Because that's the one that goes to the Secretary of HHS. And we don't need a three-pager or four-pager letter to the Secretary. It could be supported with other material. But if it could be more, it would be good.

Member Clawson: Paul, understand something though.

Member Ziemer: Yes.

Member Clawson: You know, this is all kind of a little bit different. We usually have a work, a Board Chair --

Member Ziemer: Yeah, I understand.

Member Clawson: -- and we work through a lot of this.

Member Ziemer: Yeah, I understand.

Member Clawson: And I want to say right now, I've

said that about the letter that we have sent to the Secretary for years with all the dangling participles, and everything else like that. I think we could have summed it up in about a half a page.

But the thing is, is we've got this vote taken care of. We can change any of these things. We'll involve NIOSH in it, and go from there. But this is the Board's information and we'll go from there.

But it'll just, the one thing that I would like is Rashaun, as we do this with the Department of Labor, I'd like this in writing so that we can share this with all the Board Members. So that when we come to the next Board meeting, we can fully understand what their issues are or so forth.

Dr. Roberts: Okay, certainly. And yeah, there is a just to kind of speak to your point, Paul, about, you know, covering this in the teleconference versus waiting for the two-day meeting, and hopefully we will have the loose ends tied up and be good to go.

Adjourn

Okay, alright. Well, with that I think we can go ahead and adjourn.

(Whereupon, the above-entitled matter went off the record at 5:16 p.m.)