CENTERS FOR DISEASE CONTROL AND PREVENTION

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH

ADVISORY BOARD ON RADIATION AND WORKER HEALTH

SAVANNAH RIVER SITE WORK GROUP MEETING

WEDNESDAY, SEPTEMBER 25, 2024

The meeting convened at 11:00 A.M. EDT

via teleconference/videoconference,

Bradley Clawson, Chair, presiding.

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Members Present:

Bradley Clawson, Chair

James Lockey, Member

David Pompa, Member

Paul L. Ziemer, Member

Registered and/or Public Comment Participants:

Rashaun Roberts, Designated Federal Official

Nancy Adams, NIOSH contractor

Zaida Burgos, NIOSH contractor

Bob Barton, SC&A

Ron Buchanan, SC&A

John Cardarelli II, NIOSH/DCAS/ORAU

Nancy Chalmers, ORAU Team

Denise DeGarmo, Authorized Representative of SEC-00256

Joe Fitzgerald, SC&A

John Hawkinson

Malia Holzberger, HHS, OGC

Amy Mangel, SC&A

Pat McCloskey

Charles Nelson, SC&A

LaVon Rutherford, NIOSH/DCAS/ORAU

Mutty Sharfi

Scott Siebert

Matthew Smith

Tim Taulbee, NIOSH/DCAS/ORAU

Registered and/or Public Comment Participants Continued:

Zachariah Tribbett

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PROCEEDINGS

(11:00 A.M.)

WELCOME AND ROLL CALL

DR. ROBERTS: So, I am showing 11:00 a.m. Eastern, so I'm going to go ahead and greet everyone and wish everyone a good morning. Welcome to the Advisory Board Radiation and Worker Health's meeting of the Savannah River Site Work Group. I'm Rashaun Roberts. I'm the designated federal official for the board. The agenda, presentations, and other materials and information for today can be found on the NIOSH website under scheduled meetings for September of 2024.

So, with that brief welcome and orientation, I'm going to go ahead and move into roll call. Since Board Members who have conflicts with regard to this site can't sit on this work group, there are no conflicts of interest for the work group members. Other staff do need to state any relevant conflicts as I move through the roll call. So, let's go ahead and start with the work group chair, Clawson.

CHAIR CLAWSON: Here. No conflicts.

DR. ROBERTS: Okay. Lockey?

MEMBER LOCKEY: Here. No conflicts.

DR. ROBERTS: Pompa? Okay. And Ziemer?

MEMBER ZIEMER: Here.

DR. ROBERTS: Okay. All right. Let's go ahead and move into roll call for NIOSH, DCAS, and ORAU.

DR. TAULBEE: This is Tim Taulbee. No conflicts with Savannah River.

DR. ULSH: Brad Ulsh is here. No conflicts with Savannah River.

DR. CARDARELLI: This is John Cardarelli. No conflicts with Savannah River.

DR. CHALMERS: Nancy Chalmers, ORAU Team. No conflicts with Savannah River.

DR. ROBERTS: Thank you. Anyone else for DCAS/ORAU? Okay. Let's move on to SC&A, please.

MR. BARTON: Bob Barton, SC&A. No conflicts.

DR. BUCHANAN: Ron Buchanan, SC&A. No conflicts with Savannah River.

MR. FITZGERALD: And Joe Fitzgerald. No conflicts.

MS. MANGEL: Amy Mangel. No conflicts at Savannah River.

DR. ROBERTS: Anyone else for SC&A? Okay. Let's move on to, excuse me, HHS and contractors.

MS. HOLZBERGER: Malia Holzberger, HHS, OGC. No conflicts.

MS. ADAMS: Nancy Adams, NIOSH contractor.

DR. ROBERTS: Okay. Is there anyone present from the departments, DOL, DOE? Okay. And last but not least, are there any members of the public who would like to register attendance?

DR. DEGARMO: Dr. Denise DeGarmo, authorized representative of the SEC-00256 Pinellas Plant.

DR. ROBERTS: Okay. Good morning, and welcome. Any other

members of the public? Okay. Well, thank you, and, again, welcome to all. I do need to go over a couple of additional items before I turn the floor over to Mr. Brad Clawson, who chairs this work group.

So, to keep everything running as smoothly as possible and so that everyone speaking can be clearly understood, please mute yourself. If you're on Zoom, there's an icon where you can do that, or mute your phone when you're not speaking. If you're attending via telephone, you press star six to mute. If you don't have a mute button, to take yourself off, press star six again. The agenda, presentations, and background documents that are relevant to today's meeting can, again, be found on the NIOSH/DCAS website. The materials were sent to Board Members and to staff prior to the meeting. So with that, we'll go ahead and turn the meeting over to you, Brad.

CHAIR CLAWSON: Thank you, Rashaun. I appreciate that. We've been at this for a little while. I think pretty close -- about 18 or 19 years on Savannah River. So, I wanted to give just a little brief update of where we're at status-wise. The work group and the Board passed an SEC for subcontract construction workers at Savannah River from 1972 to 1990. HHS has accepted that and put that onto the books. Our question was, when -- when did it get good enough from that time forward to -- to be able to do good dose reconstruction? And that's -- that's what we came out with for the 0092 report that we were supposed to be going forth with on that.

With that being said, we'll just get right into the work. And SC&A has

a presentation. And we'll go through this and have a more thorough discussion when we get done with that. So I'll turn it over to SC&A.

SC&A PRESENTATION: SAVANNAH RIVER SITE SEC (1991-2007): RESPONSES TO NIOSH REVIEWS

MR. FITZGERALD: Thanks, Brad. This is Joe Fitzgerald. I'm going to give this portion of the presentation, and I just want to note that this is a collaborative effort. My colleagues Bob Barton and Ron Buchanan worked with me on this, and we may do a little tag team here and there if there's issues or questions on those particular topics.

Next page, please.

I'm going to just walk through a little bit of an introduction. I know we have some participants, listeners, who may not be as familiar with this rather lengthy history. So, I'm just going to walk through it rather quickly on, at least, the SEC-103 milestones. As Brad noted, July 12, 2021, the Board recommendation for an SEC class for subcontractors, that was designated in the Federal Register on October 12, 2021. So, that was the milestone for the 1972 to 1990 subcontractor class.

So, the tasking that SC&A received from the work group was to look at the successive years of the qualified period. That's up to -- through 2007. So, 1991 through 2007. And basically review the -- the evidence in terms of -- of job-specific bioassay implementation, program assurance, the availability of job-specific bioassay data. All the issues that were germane

to the SEC evaluation as well as the recognition or the award that was given for 1972 to -- to 1990.

So, what we were looking for, what's colloquially called a cutoff point, when did, in fact, the data as well as the program assurance sufficiently improve that dose reconstruction with sufficient accuracy would be feasible. So, we were looking for whatever evidence that we could identify that would aid the work group and then the Board to make that decision as far as what an appropriate cutoff point would be from that 1991 through 2007.

So, that was the focus of our 2022, excuse me, report that stemmed from that particular tasking. And we did look at data completeness. We did look at procedural upgrades, again, looking for any threshold, milestones, or timing that would be useful to highlight. And the question that we were trying to answer was, when was job-specific bioassay monitoring becoming sufficient enough to support dose reconstruction with sufficient accuracy.

In 2023, January 2023, NIOSH issued its response. And the work group then met a couple months later, actually, to discuss both the SC&A report as well as the NIOSH response. And I might add that because of the relative brevity of the time period between January and March, our response was -- I guess you could characterize it as preliminary, certainly highlights of what we felt were important, but not actually a formal response. So, that was what was presented in the March 2023 session.

I'm not going to go through in detail the next chart. I mean, I just -- I think what this highlights is that between December of 2023 and now,

there's been a relatively high level of activity, even though the work group did not meet. We did get the TRACK database to take a look at, which we did, and provided certainly our analysis of that in response to NIOSH's review. I think Dr. Lockey had requested that we take a look at the feasibility and utility of a subcontractor comparison with other worker cohorts at Savannah River during this time frame and just to see what the data might tell us, the bioassay data. And we, in fact, did that, issued a report, and I believe today you'll also get a presentation from NIOSH on its parallel review of the same information.

So anyway, the starting point for what SC&A did in this focused review, obviously, is the designated SEC for '72 to '90. That contains the elements of the issues, as well as what was seen as the dose reconstructability issue for that time frame for subcontractors. And the tasking that the work group gave us was to, in fact, look at the time frame after 1990 to see at what point these considerations and these deficiencies and gaps may have been remedied by program improvements, as well as the sufficiency of bioassay data.

Next slide. I think you're one behind. Okay.

I think this is probably the important one. I want to dwell on the second bullet in particular. Subcontractor construction trades workers conducted a broad range of work activities. That's why we're talking about this particular cohort. They may have worked in high-contamination, high-airborne reactivity areas. They may have been utilized for short-term high-

exposure work tasks. I think there's been a lot of discussion about, you know, is there a difference between this particular work category -- worker category and other categories. I think the original concern stemmed from this particular issue that, in fact, there was evidence and testimonies to the fact that subcontractor construction trade workers did get employed in perhaps higher-contamination, higher-airborne reactivity areas. And these were intermittent tasks, many of which did -- many of which the workers did not get termination bioassays and came and went. And there was certainly a concern that -- that the -- the records for those bioassays may not be available.

Again, these were transient workers. They did not work long periods of the Savannah River and were tasked with nonroutine radiological jobs -- I'm reading from the SEC basis -- nonroutine radiological jobs under work permits, and thus were not likely enrolled in the routine, including termination bioassay monitoring program. So, that's the -- the highlight and the importance of this particular worker category and why we're focused on looking at the completeness of the information that we may have for that particular cohort.

Next slide, please.

Okay. So, the recommendation letter -- you're on the wrong one.

The recommendation letter found that there was insufficient information, including the lack of job-specific radio bioassay monitoring data for subcontractor construction trade workers and assurance of worker

monitoring and source terminal data. And those are the two twin issues that we focused in on in our focused review. Okay. It came down to the two poles in the tent, so to speak, that were part of the Board's recommendation letter for the previous SEC, which is that there was insufficient information, the lack of job-specific monitoring data. And beyond that, there was a lack of assurance of workplace monitoring and source term data that would enable NIOSH to estimate with sufficient accuracy all potential internal doses. I think there's certainly in response to our conclusion five, I noticed that there was a lot of sort of interpretation of what's the intent and focus of our review, the 2022 review would be on -- on -- on the time frame 1991 to 2007. And I don't know how else this can be any more clear than, certainly, the highlighting of these two aspects of the basis for the Advisory Board's recommendation on the previous SEC. That is where we're focused on, and that's what we're looking at in terms of the successive years.

Okay, next one.

So the question is, when did information become sufficient -- and that's the word that's in the SEC basis for the previous period -- to enable dose reconstruction with sufficient accuracy? Well, again, we're talking 1991 to 2007. In our focused review, we looked at specifically radiological work permits and the job-specific bioassays procedures and practices and how they were implemented. In other words, we're looking at execution.

The fact that before 1990, there wasn't a working or implemented radiological worker permit program at Savannah River, no RWP program. It

was in the procedures, but as the Tiger Team in 1990 verified, it wasn't being implemented as written. So, in terms of the radiological improvement program that Westinghouse was required to put in place as a new contractor in 1991, one of the key priorities was to, in fact, implement a working radiological work permit program, including job-specific bioassays. And that certainly was something that, as far as this time period, we wanted to examine in terms of implementation and to what extent we could see evidence that an RWP program was in place, being implemented, and that it was resulting in job-specific bioassay -- bioassays being performed. And in concert with that, using, I think, the approach and the matching process that was (indiscernible) in Report 92.

And again, we go back to Report 92 because that was the sampling regime that the work group, NIOSH, and SC&A had agreed on originally as the means to get to the question of data completeness for job-specific bioassays. And that was in the 2018-2019 time frame. And so, we go back to that as the clearest means to look at this question of, were job-specific bioassays, in fact, being implemented as prescribed by RWPs that were in place?

Next one, please.

Okay. So, as I indicated, in 2023 -- January 2023, we did get a response from NIOSH to this focused review. And interestingly, in that response, a number of issues were raised, which, in my view, are the same ones that were raised for the previous SEC in the, you know, 1972-1990

time frame. And having spent three or four years debating those issues and bringing them to the work group and then to the full Board for resolution, I guess I'm -- I'm a little quizzical about why are we revisiting these. But I'm going to go through some of the analysis that we did on the issues that were raised.

First bullet, NIOSH notes that the original intent of Report 92 was not to determine compliance or completeness, but representativeness. There is no debate from our standpoint. This issue has been raised in the past. But our issue is simply the completeness of -- of -- of job-specific bioassay data. We did use the word compliance, quote/unquote, in a portion of our report, a relatively small portion that refers to bioassay monitoring data compliance.

And this is the statement. SC&A's analysis was only to indicate areas of compliance or noncompliance of subcontractor bioassay data to provide markers to aid in an evaluation of the adequacy of the subcontractor bioassay data. And we have pointed out in almost all of our reports that data completeness and representativeness are essentially two sides of the same coin as represented in IG-006. And the Board review of Report 0092 has addressed both of these issues.

Given -- and this, again, stemmed from the original conclusion from Report 92 that, quote, a large percentage of subcontractors were monitored for potential intakes while working under a job plan SWP or RWP. And the incompleteness of job-specific bioassay data is required under job plans and RWPs. And the lack of the RWPs, we found, and the Board agreed,

undermined the representativeness of dose reconstruction for subcontractors in '72 to '90.

So, you know, the -- the question of how to interpret the intent of Report 92 and how it addresses data completeness, I would contend, has already been pretty well addressed in the last six or seven years of review on the SEC questions and has been reviewed and adjudicated by the Board in its decision on the '72 to '90 SEC. So, I don't think there's any debate from us on how Report 92 addresses data completeness.

The next issue, which is job-specific sampling, in its response, NIOSH maintains that job-specific samples were used for normal operations as part of the routine sampling program, i.e., they were not special samples realized primarily as a means of efficiency to add workers to the routine bioassay program in the field and that the SRS procedures, which were defined in 5Q1, this is the Westinghouse new procedures, in '95 to '96 time frame were confusing. I'm not sure what to say about it except that we believe the SRS requirements, the Westinghouse requirements that were developed and went through a number of reviews -- I mean, I had like six or seven versions of 5Q1.1-506 as it was going through the health physics review -- we feel those requirements were explicit and clear. We could watch as those requirements were refined by the staff and made more explicit about nonroutine radiologic hazards. And they were defined as those hazards not already covered by the prescheduled routine program.

Yes, there are special samples, and those were, in fact, addressed and

covered in a different SRS procedural requirement. So, there's no question that these are very clearly defined and explicitly addressed by the Westinghouse requirements that were put in place beginning in '91-'92. Furthermore, and as I said before, this is not a new question that's been raised in the dialogue with -- between NIOSH and the work group. And I think we clarified way back in 2017 that job-specific bioassay is a program prescribed in response to a specific event, the job, but it's not a special bioassay. So, again, I don't -- I don't see this as a new issue. It's an issue that's been raised several times in the past, and the work group, as well as the full Board, has pretty much reviewed, addressed, and resolved any questions about it.

Next one.

Yeah, this -- this one is on the NOV and Savannah River self-assessments. This has come up almost every review milestone since 2017. And in this latest iteration, NIOSH diminishes the significance of the 1997 self-assessment finding of 79 percent noncompliance for return job-specific bioassays, given the relatively small proportion represented by those bioassays. And we never disputed that it is roughly 5 percent, I think is the figure I remember. However, as I pointed out earlier, that 5 percent represents a category of workers with a type of potential exposure which may be much different than experienced by other routine worker exposures.

So, we want to treat this carefully, and we want to make sure that if one is missing a high proportion -- and this is by virtue of an actual survey,

a high proportion of bioassays in a particular category of workers, we need to go back and take a look at whether or not the data is complete enough and representative enough to support a coexposure model or anything else one wants to do to address that data.

And it's not a compliance issue. We've said that repeatedly. In fact, the self-assessment result by Westinghouse in 1997, this was the one that pointed out that there was 79 percent of the job-specific bioassays that were not submitted, therefore missing from the record, was the stimulus for this work group and the Board and NIOSH to go back and examine this category of bioassays and to look at whether or not there were broader implications given that particular finding. Again, nothing to do with compliance, per se. More to do with, was it an indication of a more deep-seated, more broad deficiency in the availability of bioassays that would have an impact on the dose reconstructability of that particular class of workers. And as I noted earlier, the Board did come to a conclusion after several years of reviewing such data that, in fact, for the '72 to 1990 period, that deficiency was, in fact, broader and did impair dose reconstructability for subcontractors in that time frame.

So, again, we continue to disagree with this characterization. And we feel it gives us a compelling reason to look at this class of workers. But that is as far as it goes. It's not a question of compliance or the history of the notice of violation. It was a milestone that was a red flag that certainly this work group and the Board wanted to pursue and examine for the sake of

dose reconstruction more than anything else.

Next one, please.

I'm going to go through this, but Bob may want to jump in on -- if he has any elaboration. NIOSH interview -- the NIOSH interview with the lead internal dosimetrist indicated that a computer program termed TRACK was created in 1991 to document incident-related internal monitoring. And this documents the results of -- again, we mentioned special bioassay samples. This focuses on special bioassay samples and generates reminders to ensure that the program follows up on bioassays as needed. And as pointed out here, it was eventually incorporated into the ProRad electronic database at Savannah River in 2002. The work group wanted SC&A to review the TRACK database obtained from Savannah River and provide it to the work group and then to us in 2023.

Bob, if you want to jump in and just give a summary of what you examined on the TRACK database, I think that would probably be good.

MR. BARTON: Sure. Happy to, Joe. I assume everyone can hear me okay. And can folks hear me out there?

CHAIR CLAWSON: Yes. We can -- Bob, this is Brad.

MR. BARTON: Okay. Great. Yeah. So, the TRACK database is certainly very interesting. As Joe just mentioned, it was basically set up in 1991 as a means to track incidents, radiological incidents that were noted and, in many cases, follow-up internal dosimetry was required. So, what we found when we looked through it is you have your energy employee

information, you know, basic name and social security number, which actually allows for the identification of subcontractors within that database.

And we found that about 14 percent were associated with subcontractors. The large proportion were associated with SRS Nuclear Solutions and Westinghouse, which are essentially the prime contractors. And the other lesser ones, you know, I know some were associated with the -- with the MOX facility, Mixed Oxide facility. But really the large proportion was for the prime contractors, and about 14 percent were the subcontractors.

You also had the date, location, and a very brief description of what the incident was. And they say it's generally less than a dozen words, so it would be like, you know, a spill happened, basically might be the entry within the database. Also included with the incident entry, again, this would be basically like a row in an Excel file, is any sort of bioassay information. The type, whether it was a fecal, in vivo, urinalysis, what have you. And also what the contaminant of interest was for that incident. And to also documate -- document any calculated intake based on the incident. And we found that about 12 percent of these entries in the TRACK database -- and again, I'm not sure, certainly SC&A is not sure what TRACK might stand for, but it might certainly just be to track incident information. But about 12 percent documented an intake.

And so some just conclusions regarding the TRACK database -- and this is all contained in our memo on the subject, which is, or actually it's an

appendix, really, as part of our report -- was that follow-up monitoring, i.e., a urinalysis result, was specified in the database approximately two-thirds of these incident entries. Just something that we noted was that there was actually a downward trend in the number of documented incidents from '94 to '96, though a significant spike in 1997. We don't really have a real explanation for that, but one could certainly presume that that was a result of the sort of tightening of the belts of the entire program really to really track any incidents that occurred in the later years.

One thing we did was to take these database entries, which again contain names and social security numbers, with the actual electronic bioassay database for the entire site. And we found that, basically, between 95 to near 100 percent for the nuclides of interest may not have had immediate follow-up. It was about 95 percent for the trivalents, and again close to 100 percent for plutonium, at least had some sort of monitoring, usually a urinalysis sample within a year of the incident entry.

And so -- and we also cross-compared in the other direction, and say, okay, let's look at the positive bioassay results that we have for the entire site, and we found that really almost all of them, the majority, were reflected in some form of a TRACK entry. But again, sort of the final point here is that, well, this TRACK database wouldn't really reflect internal exposure for those job-specific bioassays which weren't collected, because there would be no indication to include an incident in that form, because we simply didn't have a job-specific bioassay associated with whatever project

was being done at that time. So, I think that's really the final -- our final conclusion anyway.

It's certainly a very useful database. It shows that situations were certainly improving at SRS during this period in the '90s, and efforts were certainly made to track any incidents that might have occurred that should have required a special sample, but it does not really speak to what we're talking about today, which is the gap that was noted in 1997 of the 79% incompleteness, if you will. I won't say noncompliance, but incompleteness in job-specific bioassays.

So, if you don't have the data, you're not going to find it in the TRACK database. So, I think that really just sort of sums up our -- our impressions when looking at TRACK. But again, it's a useful tool, especially when considering special bioassays, but may not be especially reflective of job-specific bioassays since they weren't actually collected.

Joe, I'll turn it back over to you.

MR. FITZGERALD: Yeah, thank you, Bob.

I don't know if it would be helpful to take any questions or comments now or wait until the end. I'll leave it up to you, Brad.

CHAIR CLAWSON: That's up to the Board members. Do any of the work group members have any questions they want to do now, or do they want to wait until after NIOSH does their presentation and kind of get a fuller picture of both sides? What do you think, Lockey?

MEMBER LOCKEY: What do you think, Brad?

CHAIR CLAWSON: I think I -- I'd like to see NIOSH's, and then -- then we could kind of do questions in there. But I want to make sure before we leave SC&A's presentations if there are any questions specifically to their -- to this -- these slides, that you have your opportunity to be able to ask the question.

MEMBER LOCKEY: Yeah, well, let me look at the TRACK data. I actually draw the opposite conclusion about the TRACK data. The TRACK data to me indicates that everything that needed to be caught was in the databases. There wasn't any outliers. If there was something that needed to be captured, it was reflected in the databases. In other words, the data -- I'm looking for data that indicates that there might have been exposures that were present that weren't -- that can be found in the databases that aren't reflective of incidental or accidental exposures. And the TRACK data to me really indicates that they really caught all the exposures, and they -- and all the exposures are in the databases. And there aren't any really examples where a flag would be raise its -- would be raised up that says there are situations here that just were not caught, and here's the objective data that shows that.

One can always say there may have been an exposure, there may have been an incidence, we may have done this, we may have done that, but, in fact, if your database doesn't support that, then there's no objective data that supports that may hypothesis. And so, I really draw the exact opposite conclusion about this TRACK database.

It indicates that the exposure databases and bioassays are, in fact, very complete, and there's nothing in those databases that indicate that they're not comprehensive.

CHAIR CLAWSON: And Jim, I -- I understand what you're saying, and I guess I have to jump back into my real world. This TRACK database to me is what we call an incident database. If we caught something, it went into this database. This is just to track it for the individuals. We had a lot of these different databases throughout the whole DOE complex. We had near miss ones. We had to change the name on that because they didn't like that one. But they were trying to do a process to be able to capture the, excuse the expression, but the old shits that have happened throughout the deal.

But the issue is, is it comes back to these job-specific bioassays. If you are not looking for those, they are not go -- they're just -- this TRACK database is not going to capture that. It may capture some isotopes, but if your job-specific bioassay does not call it out, you're not going to see anything. These are -- this -- this is part of the process that DOE has gone through for the whole year -- through their whole life. And look at the time period that this is actually happening in. They're starting to become more accountable for the dosimetry of the people and the monitoring of them, and they're trying to get their RWPs in place and also to better understand the bioassay program that they want to be able to build, which later on they've done quite a bit on.

Because I -- I -- I -- you know, and everybody's -- has their own

opinion and stuff, but to me, this TRACK database is just an incident database, period. That's all it does.

MEMBER LOCKEY: And that's why it's important to me, Brad, because it is an incident, it's not routine. If some accident happened, there was an accidental spill, something out of the routine, apparently they were very on top of it. And -- and -- and they -- they got the necessary information that they needed to make sure that they knew what was going on. This is -- I understand this is not routine. This is where an incident would happen.

And for me, if this TRACK database was not reflected in the overall bioassay databases that there were outliers here, that would raise all kinds of red flags to me. But it isn't. It indicates (audio lost for Member Lockey).

CHAIR CLAWSON: You just went off, James. Hello?

MEMBER LOCKEY: Brad, can you hear me?

CHAIR CLAWSON: I can hear you now.

MEMBER LOCKEY: Yeah, I'm sorry. To me, maybe I'm wrong on what this TRACK database stands for, but this is really, as you said, incident data, accidental spill data. And that data, 100 percent was captured in the database, 100 percent captured. And so, from a scientific perspective, if it -- if I had -- if there was data that indicated that this incident data was not captured, okay, and there were outliers there, that would raise some red flags to me. But the incident data was captured. I mean, when there was an accidental exposure, the data was captured. And that's reflected in the database.

And so, if I was going back and reconstruction -- and reconstructing a dose response algorithm in this, I would want to know that, well, what does the accidental data look like? Is it captured? Is it reflected in the database? Is it -- are the exposures unusual in comparison to routine bioassays? Are these incident data outliers in relationship to actual exposures? And I'm hearing that's not the case. And so, I -- I would -- SC&A, I totally disagree with their conclusions about this.

This -- this supports the hypothesis that we asked for. Does the TRACK database support the bioassay data for the cohort as a whole? And for me, it does.

MEMBER ZIEMER: Brad, this is Paul. I agree with Jim on those points. I think the TRACK database is doing what it is intended to do to try to compare it right now with what's going on in other parts of the complex, I don't think it's going to match this. But I think it would be better to hear the other side of the picture from NIOSH and also go through the rest of this. I think Joe and Bob did a good job of explaining SC&A's understanding of this, and I'd like to hear the other side as well. So, I think before we continue to debate this, we should hear the rest of the story.

CHAIR CLAWSON: That sounds good. I appreciate that, Paul. So, with that being said, we'll turn it over to NIOSH to give their presentation. We'll go from there.

MR. FITZGERALD: Not quite done, Brad.

CHAIR CLAWSON: Oh, not? Okay, sorry.

MR. FITZGERALD: Anyway, this is Joe -- Joe again.

Going back to the SC&A response in twenty -- focused review in 2022, we had five conclusions. I'm going to go through these relatively quickly. Conclusion one, really was focused on looking at the element of the Advisory Board's SEC recommendation, which dealt with a concern over the assurance of workplace monitoring and source term data. There was a finding that there was insufficient information to know, in fact, that workplace monitoring was being assured in the context of subcontractors and job specific bioassays.

So, in looking at Report 92, which is again where we started from, we just did not see a sampling process or premise that was grounded on what the actual Westinghouse procedures and policies and practices, actual execution, would have been in that 1991-'98 time frame. And -- and we did spend a great -- or I should say SC&A spent a great deal of time looking at the procedures being implemented, the 521 procedure, which governed the job-specific bioassays, the RWP requirements that were being executed in the '91-'92 time frame. I mean, Westinghouse was literally putting in place in a lot of respects de novo in some facilities a systematic RWP program site-wide.

So, it was -- it was a tall task and I think it bore fruit relatively soon. I think certainly we and NIOSH agree that you certainly started seeing many more RWPs being -- being issued with job-specific bioassay requirements. Our only question in the early '90s was -- and this is with the shadow of the

finding in 1997 that was made in that self-assessment, to what extent were the RWPs being developed, to what extent were the job-specific requirements in fact being followed, and did you see any evidence of -- of -- of bioassays being collected in that pre '96-'97 time frame? So, a lot of focus on whether the assurance of workplace monitoring was in fact being -- being implemented.

The NIOSH response was that they acknowledged increasing RWP job-specific bioassays, but they found that to be due to reliance on procedures versus RWP forms. We didn't make that distinction, so I'm not sure there's a real argument there. It's just that certainly the Westinghouse upgraded procedure entailed a slew of facility requirements in terms of source term identification and RWP, you know, prescriptions, forms, and also designation of job-specific bioassays in a much more specific way than was done in the job plans in the DuPont era.

So, all that was happening, and the -- the finding that RWP forms lag behind procedure-based bioassays, I don't -- I didn't see any evidence of that either way, and that there was no evidence of RWP or bioassay inadequacy in the early '90s. Again, I think that's debatable. I think the procedure for RWPs weren't even put in place until '91-'92, and certainly the rollout took some time site-wide. So, I would turn that around and say, you know, what is the evidence that, in fact, it was being implemented effectively, and that, in fact, job-specific bioassays were being required and collected. Again, with the shadow of the '97 finding, you know, certainly the

question of whether that culture on the ground was, in fact, responding to these changes that were being put in place by Westinghouse in a rather rapid way in the early '90s.

And then, of course, there's the observation, and this is tied to, I think, NIOSH's response to our conclusion five, that, anyway, the absence of job-specific bioassay requirements and RWPs is irrelevant, which is a little bit daunting since that was -- that figured very prominently in the SEC basis and recommendation for '72 to '90. So, we certainly were surprised to see that. But, anyway, our conclusion -- our response to the NIOSH response to conclusion one was that, again, RWPs, and this is in terms of the -- of the -- the actual evidence in terms of development and review and implementation of Westinghouse's procedure didn't take place until late '92.

Demonstrable implementation is what we were actually looking at because that's the wording in the SEC finding for the previous SEC, was looking -- the (indiscernible) implementation of RWP-driven job-specific bioassay requirements, and that we didn't see real evidence of until a little later. And I think in the '94-'95 period, it was pretty obvious that it was not only rolled out but being implemented fully.

And, I think we would, again, take exception to the conclusion -- NIOSH's conclusion that job-specific bioassay requirements and RWPs are irrelevant to the issue. We feel that RWP requirements for bioassay are the only evaluative marker that we can find for job-specific bioassay performance or assurance, particularly in the face of Savannah River's

history of nonconformance with its own procedures. So, to -- to say that this was all happening by virtue of procedure driven implementation, I think, is questionable given the history.

I think, up until that time, procedures weren't followed. There was an RWP procedure that DuPont had put on the books that was ignored. And, actually, Westinghouse did not implement it either. It was only implemented after the Tiger Team pointed out the fact that RWPs were not being implemented at Savannah River. So, this -- this is -- isn't sort of a synthetic issue. It's a real-life key aspect of any radiological program in the DOE complex. A radiological worker permit program with designated bioassays was not being implemented as late as 1990. And, only by virtue of the Tiger Team and the new contractor was a procedure put in place.

And so, our question very clearly was, to what extent did that procedure lead to substantial conformance and more job-specific bioassays being implemented.

Okay, next one.

Okay. The -- conclusion two and three get down to, what I would call, more computational issues, tactical issues, with respect to Report 92. These aren't new ones. I think we've raised these before, so I won't really dwell on them too much. But, we did find in the 2022 review that NIOSH did not address all the nuclides listed in the RWPs when determining data completeness for job-specific bioassay monitoring. And, therefore, the percentage of matching results for direct and effective monitoring appear to

be overstated in that report. And, NIOSH basically agreed that they did not address all nuclides, but, there has been updates on those tallies in response. We have previous comments, obviously.

But, in general, I think NIOSH contends that their conclusion has not changed. They do believe, for all these issues, a coexposure model can still be constructed. And, the updated tallies are in Table 5 of their response. And I think the only finding that we would put forward is that those are very similar to SC&A's values in our Table 3 and 4 of the 2020 review. So, I don't think there is an issue there.

I will defer to my colleague, Ron Buchanan. Is there anything else you want to say about that particular conclusion?

DR. BUCHANAN: No. This is Ron Buchanan of SC&A. No, that's pretty much it in summary. We don't disagree with NIOSH's conclusion after they redid their tally. Pretty much falls in the same range that we calculated. The question is, is that acceptable? Not necessarily the calculations, we agree on that. And it's a subjective matter; what is enough completeness.

MR. FITZGERALD: Ron, why don't you take us through conclusion 3? I think that was another one you had focused on.

DR. BUCHANAN: Well, conclusion 3 gets down into the nitty gritty of how you'd say a person was monitored or not. In this situation, just briefly, what NIOSH did was in -- in Report 90, they -- they went back and they looked at the worker and see if the sub -- construction trade worker was

monitored for an RWP when they should have been. And if they weren't, was there somebody working with them that was monitored and had bioassay data to show that the bioassay data in general would represent the subcontractor that wasn't monitored. So, this is looking at individual workers, individual RWPs. And what they did is they looked at from '91 to '98, I believe it was, for the major isotopes and the RWPs to see if they was matches for somebody that was a worker -- was monitored, if the subcontractor wasn't. And so, they matched the RWP, the date, and the time, and the exposure potential.

Now, the biggest question was most of the RWPs matched, their numbers were corresponding, and the time was sometimes similar, sometimes it was different. They did a test using plus or minus 15 minutes. We did it a little more lenient; we said plus or minus an hour. And so, we pretty much agree on those three criteria. The main criteria that we had debate on was the craft. And I looked for crafts that was the same. They looked for crafts that were the same or offered higher potential exposure, not including laborers. And so, I went through the retally -- retallied the information and looked at the percentages, if they used their criteria.

And the difficulty with that, I agree that they can use a different craft because it has the higher potential for exposure. However, after 30 years and all these records, it's sometimes hard to tell whether they would have. Generally, if they had the same craft, like they was all plumbers or they was all doing something that were similar, like electricians, you would know that

they would be probably similar exposed. However, if you had an electrician and a boilermaker, you don't know if they'd be the same. So, that brings in professional judgment. Because the one you use for a substitute, their bioassay data would indicate that he had the same or higher exposure.

Now, this is somewhat more restrictive using all this information, all these criteria, than you do in a normal coexposure database where you just use on a yearly basis or something and look at the norm and statistical information that you can get from it. However, the purpose of 92 was to determine if the -- the subcontract workers were actually monitored or had somebody working with them, that would reflect their exposure in the bioassay database. And so, we pretty much agree on this, except since NIOSH has re-worked their -- including all the radionuclides, except, I guess, the biggest issue is do you include a craftsman. And I say yes, if you can show that they have the same or higher exposure, but then that is a subjective call 30 years later on, you know, several hundred-type matches. So, that's where we're at on that.

I don't think there's a big debate on what's coming up for '91 through '97 or '98. It was a point that we made back when we evaluated Report 92.

MR. FITZGERALD: Thanks, Ron.

DR. BUCHANAN: Turn it back over to you, Joe.

MR. FITZGERALD: Okay. Let me move on to conclusion four. If conclusion one, as I think described, really focuses on the assurance of workplace monitoring, that element of the Board's finding for '72 to '90,

conclusion four deals with the question of a lack of job-specific radio bioassay monitoring data. So, I said there was two tent poles, that's the other tent pole. And the -- as I see the dilemma, you have this 1997 survey of job-specific bioassays. And this is the -- the 79 percent finding. I won't go into that. I think everybody is very familiar with it. And you have the RWP program, the Westinghouse procedures, being put on the ground and executed by '92. So, you -- you essentially have a time frame. And I would even acknowledge -- and I think Tim has mentioned this before, and I don't disagree -- that the Westinghouse, I think, concluded when it was going back to look at whether any further surveying ought to be done in prior years that none was required for 1996. Looking at the -- the -- the operating information and the types of exposures that may have existed. They made a judgment that they would not -- it would not be worthwhile to survey '96.

So, with '96 being an end year and perhaps '92 being the point where these new 521 RWP with job-specific procedures were put in place, we have that time frame where certainly one could argue that the job-specific bioassay program was being executed, and there is evidence that more job-specific bioassays -- representative job-specific bioassays were being collected. It doesn't necessarily resolve the issue of -- of responsiveness in terms of bioassays being turned in. That issue still exists for the latter years. But in terms of the question of whether there is an adequate number of RWPs, something that would perhaps -- that could be examined for a

distribution, that certainly is arguably the time frame that we would be talking about.

In terms of NIOSH's response to the question of -- of bioassay data being incomplete, I think NIOSH disagrees that the -- that the self-assessments -- and this is again the NOB issue -- indicates incompleteness. We've already covered that. And that finding a program --a bioassay program inaccuracy is -- is even relevant to constructing a bounding coexposure model, we don't even debate that. We -- we instead see the relevancy of bioassay program inaccuracy being to IG-006, data completeness and represent -- representativeness, which has always been that issue.

And that issue is upstream from coexposure model development. And I think that may be the big dividing point that we have on a lot of these issues, that we, you know -- we follow the hierarchy in IG-006 in terms of what needs to be established to provide the basis for a coexposure model. And one of the first priorities is establishing the representativeness of the data. And in this case and certainly in the previous SEC, the Board agreed that that representativeness wasn't adequate for subcontractors with job-specific bioassays for the previous time period. So, for this successive time period, that question is still there, and it still precedes coexposure development in terms of how complete is the job-specific bioassay database, and how do we know, and how do we gauge that.

And again, we gauged it from two vantage points. One, again, is

whether the procedural, the program and procedural assurance was evident and how do we know that. And the second one was looking at any measures of job-specific bioassay data that we could find. Again, we relied on Report 92 to give us that basis. And certainly open to looking at the TRACK database. But again, I think we had looked at incident databases in the previous SEC discussion and found that that did not -- did not work. I'd have to go back and give you more details, but certainly the question of including incident bioassays is not a new issue.

Conclusion four. For-cause bioassays are to follow up suspected intakes via field indicators and would not necessarily be representative for all missed intakes. I think that that's kind of what I just said. Only firm verification of job-specific bioassay completeness was performed in '97, that -- that's the 79 percent incomplete, and it was the basis, the key basis for the inquiry that we've been going through for the last five years. And that's, again, data completeness and representativeness.

For '91 to '96, and this is our focal point, SC&A has been applying the available fractional markers. These are ones that certainly were identified and the precedent set in Report 92. And this is what we're using as a tool to gauge implementation and see what the -- see what the measure of program implementation may be for job-specific bioassays.

Let me finish up with conclusion five. This one, I think, is an overarching conclusion, and maybe one should be careful with overarching conclusions, but I think all we wanted to say there was that, you know, I

keep calling them the two tent markers, but to establish feasibility, you need to balance the actual program assurance, which is implementing RWP-directed job-specific bioassays, with the completeness of the data itself, in terms of those fractional measures, and certainly looking at that as a weight of evidence, you know, what time frame where does one see a difference in that '91 to '96 is -- is the important aspect that we believe the work group would need to do in order to come up with this cutoff point.

And I hesitate because that conclusion five was interpreted that -- by, I think, NIOSH early on, that we had shifted our focus completely from looking at data completeness, the dose reconstructability issues that were surrounding the preceding SEC and were going to the other poll of looking at the coexposure models. And I think as I have emphasized throughout this, that's not the case. I mean, we see the data completeness and representativeness as IG-006 describes it, as a prerequisite to being able to develop a coexposure model. I think that's very clear in that guide. And that was the premise that we also operated under in the previous SEC discussion.

So, I don't see really any change of focus. I think what we're saying is that looking at a cutoff, you do have to examine both data completeness and procedural implementation, and you're not going to get a white and black milestone date, but you certainly will have a basis for judging when the conditions and circumstances had changed to the point where there's sufficient, you know, job-specific bioassays upon which a coexposure model

can be based. So, anyway, that's -- I think conclusion five basically says that, but I think it was interpreted perhaps in a different way by NIOSH. I just want to make sure we're clear on that. Okay.

I think we can skip to the final conclusions. Most recent NIOSH findings have either been already adjudicated by the Board in the previous SEC review, and there's a -- there's a number of them. I won't go through them all, but these are very familiar issues. Those on the work group will certainly recall most of them because we've been through them probably a half dozen times. And they have been addressed by the work group, they have been addressed by the full Board, and certainly the previous SEC had the opportunity to treat those particular proposals, and that includes some of the ones that address the issues such as the boot strap, you know, uncertain analysis, Report 94, the log books, the adequacy of SRC coexposure models. I mean, there's been a lot of assessments that were done in the lead-up to the Board decision on the previous SEC that were, in fact, examined and a lot of these issues are the same issues that were raised.

So, I'm just trying to point out that there's a lot of -- a lot of documentation, a lot of analysis, recommendations, and work done by the work group and Board on these issues, and I think there's not much else we can say about them. So, I just want to make sure that's clear that we're not recommending that we take them up again.

There's a judgment, and it is a judgment, needed regarding a cut-off

date. You know, the way the Board left it, it was the SEC for subcontractors was at least up to 1990. The -- the question is how much further would be justified based on the completeness and representativeness of RWP-directed jobs with bioassays. And we addressed it in that context and tried to provide as much illumination and guidance as far as what's available to inform that judgment. It's not perfect. There's not the specific data that -- you know, it's sort of -- if the data is missing, it's -- it's an unknown that we can't certainly identify. But it -- the degree of -- the extent of missing data is something that we certainly can look at and be able to say something about. And that's kind of where we're at.

Any questions? I didn't want to go into too much. I think the report does identify, to some extent, more of the specifics, but certainly we can hold those off for the comment period. Silence.

CHAIR CLAWSON: Yeah, dead -- dead --

MR. FITZGERALD: Dead silence.

CHAIR CLAWSON: I think

MR. FITZGERALD: Okay.

CHAIR CLAWSON: -- we'll move on to let NIOSH make their presentation, and then we'll kind of round everything else up off on that. So, I'll turn it over to John now.

NIOSH/ORAU PRESENTATION: NIOSH'S RESPONSE TO SC&A'S REVIEW OF NIOSH'S RESPONSE TO SC&A'S FOCUSED REVIEW OF ORAUT-RPRT-0092, 1991-2007

DR. CARDARELLI: All right. Thanks, Brad. I'm going to share my screen. That's the wrong one. Can everyone see the presentation?

DR. TAULBEE: Yes.

DR. CARDARELLI: Okay. Thank you. I'm going to put it nice and large here. Okay. First off, thank you for the opportunity and to respond, there's a lot that has been discussed here and I -- what I don't want to do is rehash what the Board reviewed and voted on regarding the time period up to 1990. That has been asked and answered. However, I will like to state that there is a big difference between then and this more modern era. Can you hear me?

CHAIR CLAWSON: Yes.

DR. CARDARELLI: Sorry. I -- I heard some background. All right. So, I'm going to stay focused, and I also want to say the time period back in -- prior to '90, NIOSH's positions on all of those issues have remained the same, and they are in the official record for any members of the public to go look at. Regarding this time period, 1991 to 2007 or specifically up in 1998, which is one of the main things we're talking about, this is the time period when Westinghouse took over, RWPs began to be used in a lot more common fashion. And in the notice of violation report, there are a couple other comments I'll just point out. That exposures -- and this is in the

report -- exposures tended to go down in the '90s while their ability to detect any positive bioassays improved. So, we could detect lower numbers as well as the overall trend going down. I think those are big picture items.

The other thing I wanted to bring out as I go through this presentation, and this is my opinion, I think there have been some very misleading statements that I will try to address that Joe and Bob mentioned regarding certain aspects. But I'll address those when we get to them in the presentation. Let me close this. Okay.

So, we went over those four conclusions from the previous presentation, and we are -- I'll be addressing those in these four subtitles, which is the original intent of ORAU Report 92. The purpose of the job specific sampling during the 1990s, and in -- specifically one of the issues that we were tasked or asked to do was to corroborate the interview from [identifying information redacted] with regard to how these were applied in the field during that time period. The third issue is we want to go over a little bit on the SRS self-assessments, and this is one area where I think there's been some misleading comments that I want to address. And then finally, what was the purpose and use of the TRACK database? I think the conversations we had earlier may make that portion of this discussion a little bit quicker. And then I'll wrap up with conclusions.

So, report 92. And I think that this has already been addressed by Joe, and acknowledged that, frankly, even though SC&A stated that the purpose of Report 92 was to assess the compliance of bioassay monitoring

for subCTWs and, quote, it was clear that the sampling exercise performed by NIOSH in Report 92 was to provide an indication of data completeness. Those statements are, frankly, inaccurate. The original intent of Report 92 was not to determine compliance or completeness but representativeness. It states clearly in the report that what we were asking and what we were all shooting for was whether or not unmonitored workers worked in the same environment as monitored workers. If they did, then we could use the monitored workers' exposures to assign to the unmonitored workers. That's how a coexposure model would effectively work.

We believe that Report 92 demonstrated that subcontracting construction trade workers did work alongside monitored subcontracting -- other subcontracting construction trade workers. And we concluded there is sufficient evidence to estimate or reconstruct doses using the coexposure model. So that was Report 92.

So, completeness and coexposure models, which seems to be a big issue that was brought up as concerned to be an upstream to a lot of these coexposures is in a report that NIOSH recently released, the SRDB Numbers is 196229, and it's a discussion of completeness in coexposure models. There are seven conclusions, but I'm not here to present all seven. I just want to bring two of those key conclusions, which I think are related to our discussion today.

The first is bounding the coexposure models do not require all the data, just a significant proportion of the data from the most highly exposed

workers. The second conclusion is regulatory compliance with a monitoring program or lack thereof cannot be used by itself to decide if a data set is complete enough to construct an acceptable coexposure model. So, these two conclusions address not only completeness, but also compliance issues. And I will say in SC&A's response, they generally agreed with all seven, especially by acknowledging that there is no magic number which is determined to be complete for developing a coexposure model. And so, there I am in complete agreement that really we are seeking guidance from the work group and the Board and -- on the issue of what is determined to be complete, especially for this particular site and the time period we are talking about.

I just want to read a quote from the DCAS IG-006, which is the criteria for the evaluation and use of coworker data sets. It states, quote, In general, three types of monitoring programs have been employed at sites covered under EEOICPA. These programs, listed in hierarchical order of preference for use in coworker modeling are: 1) routine, representative sampling of the coworkers; 2) routine measurement of workers with the highest exposure potential; and 3) the collection of samples after the identification of an incident. Because they are not representative of the overall distribution of exposures, programs that rely on measurement of the highest exposed workers or are incident-based require more careful consideration.

Big picture, this talks about the routine applications of monitoring and

of how we would address incident sampling. So, the purpose of the job-specific sampling and the corroborating documents, that these were really routine is going to be addressed in this section. So SRS, big picture, used a defense-in-depth approach to radiological control with the intention to prevent nontritium intakes.

So, the policy was no one has a potential for intake. We have a zero intake policy except for tritium. The engineering controls are in place. Then we have procedural controls. Then there are personal protective equipment like respirators and PPE, clothing. And then five, surveillance used to verify the engineering, procedural, and PPE controls. That surveillance data is often used in our coexposure or in our dose reconstruction efforts.

We prefer to have personal bioassay measures if we're looking at internal dosimetry because that is to the person. We often use their personal dosimeters for external radiation. If we're lacking that, we are also available to use air monitoring data that these workers may have worked in. General area, sometimes breathing zone data can be used. Other areas that give us insight into potential exposures could be the facility contamination surveys and/or personal contamination surveys. All of this information is used for us to assess what type of exposure these workers were exposed to, and did they receive a dose that we could use in our compensation record.

And I will also point out, pretty much every single one of these that we apply, we apply with a very claimant favorable assessment such that if we're in error or if there is a large uncertainty, we tend and usually do go for the

higher area because we want to make sure that we have claimant favorable processes throughout the dose reconstruction process. All right.

So, the SRS bioassay program description, quote/unquote, the communication of SRDB 167756 which says, The status of the SRS bioassay program relative to the DOE moratorium, and I give a PDF, page 8, was dated December 14, 1998. In these documents, it specifically defines what a routine and job-specific bioassay is. We spent a lot of time on that, and it's basically this: Routine and job specifics are designed to assess the adequacy of those facility controls and personal protective measures.

They were typically done -- and I'll talk about routine and job specific here -- either prospectively where we have a prescheduled samples based upon the routine work or retrospectively which is job specific samples for efficiency purposes. Everyone acknowledged that the special samples are invoked when something abnormal goes on which requires an additional bioassay, and it's really used to look for known intakes or intakes that are likely to have occurred, and we want to verify that.

Some of the language in the DOE reports talk specifically about these job-specific bioassays. The first document comes from a bioassay task team, a final report dated September 9, 1998, and that's on PDF page 30, quotes, A confirmatory bioassay program involves limited surveillance of workers to provide verification that routine bioassay, which includes job-specific bioassays, is not required. A confirmatory bioassay program for a work group having low potential for significant intake may involve

sampling of a small fraction, e.g., 10 percent of the group at a relatively constant rate over a one year period. So, that's a quote where they actually refer to these as routine bioassays.

The second quote is, Conclusion: The regulatory requirements of 10 CFR 835 do not specifically require job-specific bioassays. WSRC, which is Westinghouse, had no deliberate intake policy for nuclides other than tritium. SRS has a proven history of preventing intakes through rigorous application of engineering and administrative controls. WSRC has a bioassay program, which includes requirements for special bioassays and routinely samples 100 percent of its radiation workers. Therefore, the WSRC implementation of job-specific bioassays for actinides exceeds the regulatory requirements. I think that's the big picture that we should keep in mind as we look at these job-specific bioassays and put them in context with regard to our ability to reconstruct doses.

So, what is the purpose of the bioassay sampling? SRDB Number 167757, which is the corrective action report dated sometime in 1997, states, quote, The purpose of the job-specific bioassay sampling program is to collect bioassay samples from workers whose routine bioassay program does not include some or all of the radionuclides present at the work site or are not on a routine program. For example, a mechanic who may be routine sampled for plutonium and enriched uranium may be assigned to work on a neptunium system. A job-specific bioassay sample for the neptunium would be required to be submitted at the end of the task, unquote.

So, therefore, a quote/unquote, nonroutine sample in this context is a job-specific sample. These samples were used to supplement the routine requirements as illustrated above. Other examples exist where the job-specific bioassay sample is really being applied as a routine. In the same document, there's another quote: Job specific sampling has been implemented because currently there is no -- there is not a way of modifying the prospective bioassay program and RQB, which is the radiological qualification badge, in the field. The worker must come to the in vivo counting facility to have the bioassay program and RQB modified. This is an inefficient use of time and thus the current job specific sampling program was created.

The next quote: A routine bioassay program can be established after the fact based on where the individual actually worked and what he or she actually did. This is referred to as retrospective sampling. So, there's a lot going on here, and I wanted to basically try to summarize this in the next few slides.

So, prospective sampling, which we would consider to be routine sampling, we have a worker who is going to work at a specific area in advance. They have an RQB, which is the radiation qualification badge, which lists the isotopes that they are likely to be monitored for on a routine basis. They go and perform the work under normal operations. There's no incident. Nothing unusual occurs at all. There's no anticipation of any potential intake.

So, when their time comes up, and sometimes it could be on their birth -- birth date or a specific time of the year, and typically for many of the actinides, the routine bioassay would be left on sometimes an annual basis. Tritium would sometimes be on a monthly basis because it clears from the body more quickly than the actinides. The database shows that 95 percent of the workers who left bioassay samples during this time period, '91 to '97, basically were on the routine bioassay program.

So, retrospective sampling, which has been referred to as nonroutine, which adds to this confusion issue, follows along this next line. The worker has an RQB, but the radionuclide that they may be potentially, like the mechanic I mentioned earlier, is not on their RQB. So, instead of that person having to go all the way back to the in vivo counting facility, which could take time, it could actually delay the work for several days, they go ahead and perform the normal work.

They perform the work in that area, even though it's not on their RQB. No incidents occur, it's a normal operation, so at the end of their task, they go and leave what we call a job-specific bioassay. Again, there's no indication of potential intakes that occur because it was normal operation. That occurred 5 percent of the time. So, those are two key factors to keep in mind that this nonroutine or, quote/unquote, job-specific programs really occur very few times through that time period.

Here's another example where the confusion of how a job-specific is being referred to as a nonroutine and ultimately gets cleared up. On the

left, we have the revision number associated with the specific procedure, which is 5Q1, and it talks specifically about job-specific bioassays. You have the date is the next column. The first one is in December 1992, and the section designation of 5.1.2.1 specifically states nonroutine, comma, job-specific sampling under the section header of "nonroutine sampling." So, clearly in this context, one could easily confuse that job-specific samplings are somehow nonroutine, and some might even infer that they're specials, but they're not.

Revisions 1 and 2 have never been able to be found, but then we get to revisions 3, 4, 5, 6, and 7, and they date, basically, from an unknown all the way up to 1997, and you can see the section designation changes from nonroutine job-specific sampling to just job-specific urine samples. So, they take the word "nonroutine" away for clarity. A lot of these evolution of these protocols were the result partly of the notice of violation, and then doing a root-cause analysis to find out why this is happening. But I really want to point out under the section header that these procedures show over time that they go from a nonroutine sampling and now they clearly decide -- describe them as routine sampling.

One thing that's interesting is in Joe's presentation he gave, he basically said that the procedures were very explicit, that they call these nonroutine, and really emphasized that point, and it was a bit misleading in that context simply because the evolution of this procedure has not been presented until right now. So, that you can understand perhaps he was not

aware of the full evolution, or he's just picking the one that clearly supports his argument that these were nonroutine. I just think that that's fair to note. The last 4, 5, 6, and 7 revisions definitely support and concur the interview from [identifying information redacted], which basically needed corroboration that job specifics were really routine in nature.

So, here are the interviews. [identifying information redacted] is the primary, because we've mentioned his name here already. The question was this, in the enforcement conference summary, and I won't mention all the details on that, WSRC stated that, quote, It did not believe that any job-specific dose had been, quote, missed or unassigned, unquote.

What is the basis for this belief? Given DOE's notice of violation finding and given that WRAS acknowledged -- acknowledgment that its past corrective actions were ineffective and a large proportion of the job-specific bioassays were not submitted. In answer, I have discussed the meaning of the no deliberate intake policy and how it defines the purpose of the routine and job-specific bioassay programs for the actinides. The fact that no special bioassay was requested means that no intakes occurred that would result in missed dose. So, that was his response.

Seeking additional corroboration on that, we interviewed another, I'm sorry, there is another follow-up question for the primary SRS subject-matter expert. The question is this: Is there any way to know whether noneligible radionuclide intakes were missed due to the lack of worker participation in job-specific bioassays (up to 79 percent, as found by one

WSRE -- WSRC self-assessment) during the WSRC era beginning in 1989 up through the corrective actions in 1997 through 1998? The answer: Routine and job-specific bioassay for the actinides are prescribed only for those workers who we know have not had an intake. Again, this refers to them as routine.

We interviewed two other subject-matter experts at the site. The question that was posed to them in an effort to corroborate [identifying information redacted] responses were -- here's the question: Were job-specific samples special samples? The answer by one subject-matter expert: No. Again, special samples needed contamination events specific to isotope identification and collection of samples by time interval because of what intake -- intake of radioactive material is suspected. These were not done for job-specific samples. Job-specific bioassay was really an unusual application of the typical routine bioassay at SRS.

The third subject-matter expert was given that same question: Were job-specific samples special samples? The answer: There is a job-specific program for tritium that has been in place for long before I arrived at SRS and continues today. These samples are assigned based on the task being performed. The worker submits the samples, and a bioassay laboratory currently analyzes the samples on a weekly basis. These are not special or caused samples. And again, it's just their effort of emphasizing that job-specific samples are part of a routine program.

So, the self-assessment in 1997 is the next section. And I really want

to focus a little bit on this and the next slide. This first slide is the 1997 quarter 1 self-assessment of job-specific bioassay program. On the left is very critical. Each section that you see here in this slide contains job-specific information, but it doesn't -- it's specific to subcontractors, construction trade workers, and all others. There is no way that we can say that the blue or the red or the green section of this pie chart are only subcontracting construction trade workers. All workers could have potentially left a job-specific bioassay. And in this context, in 1997 in the first quarter, 3,093 samples were left, and only -- of those, only 107 were not submitted.

So, this represents a fairly small percentage, and it's not to diminish the application of job-specific, it's just to note that remember the 95 percent people leave routine samples. 5 percent did not. Who were those workers who didn't? We cannot identify whether they were subs, CTWs, or others, because the bioassay database does not have a variable in it that says this sample was a job-specific and this one was routine. It's just a bioassay data that says they left the sample.

Now, this is the slide where I think that there's been tremendous amount of miscommunication and some misleading statements that keep getting repeated even though we tried to put it in proper context. I'm going to attempt it here again. Again, all those -- each section contains information from all workers. These are not specific to subcontracting construction trade workers.

So, in the second quarter, where we keep hearing this value of 79 percent were not compliant, that could have been any worker could have not been compliant, not just a subcontractor construction trade worker. That only represents of the 5 percent who didn't leave a sample. So, I think what's really important here when we look at that red area there, that's all workers who didn't leave a job-specific sample, and it really represents less than 4 percent of the total samples that were taken.

So, the 79 percent really is being stated and gives a false impression that a tremendous amount of people are not compliant. And I think that that's the misleading aspect of -- of keeping -- repeating, the 79 percent value without acknowledging that it's 5 percent of the 3.9 percent. So, I think that we need to keep that in mind as we move forward, and I wish that when we move forward on talking about 79 percent, we acknowledge that it's a very small fraction of the total.

So, the full calendar year assessment in 1997, there was approximately 10,889 samples were requested in 1997. 10,000. By the end of 1997, WSRC had compared all the 1997 RWPs and sign-in sheets to the bioassay laboratory sample database and determined that 256 workers did not comply with the job-specific bioassay requirements. WSRC subsequently directed those individuals still employed at the site to submit bioassay samples. They did. The ones that were still employed. None of them had any identifiable uptake of radioactive material. So, whether or not we feel like we may have missed some people, keep in mind those people who didn't

do it could have been subs, they could have been operations workers or prime contractors. None had uptakes of actinides.

So, the purpose of the TRACK database, this is another area of some misleading information that was talked about in the previous presentation.

So, the TRACK database was created to track samples related to an abnormal situation that may cause a potential uptake. And it's really dated between 1991 and 1999, and there are about 1,800 entries or samples in this. Now, it's not 1,800 workers, it's 1,800 potential incidents that may have occurred.

So, it includes any incidents that are warranted with a special sample. That's the difference here. Something unusual occurred, a special sample is done, and this goes into the TRACK database. So, in essence, if you're involved in any work environment that has some abnormal event that occurs that causes you to leave a special sample, you are now among the highest potentially exposed workers, which is the key factor in developing our coexposure models. We want these types of people in a coexposure model to make it claimant favorable as part of our reconstruction process.

So, how does the prospective sampling work with the TRACK database? You work in a known area. Your RQB tells you you've got to leave a routine sample because you're working in an area that is on your RQB. Unfortunately, during your work period, something adverse happened. It could have been an air leak, it could have been a tear in your PPE, it could have been a detection of surface contamination. Something abnormal

occurred. That results in you having to leave a special sample. As part of that, you now find yourself in the TRACK database because of the incident.

So, what does that mean with regard to the TRACK database? You follow from left to right, the worker goes in, they're allowed to go in for the RQB, the work is performed, no events occur. It's normal. You leave a routine bioassay. Sometimes that routine bioassay might be positive. And most of the time, it's nondetect. It's not positive. So, even with a routine, that's how we check and make sure all the other protective measures, the air sampling, the monitoring, the surface contamination, if those all are working and you still get a positive, that's the last line of defense for protecting workers. So, no entry is made into the TRACK database if you have a normal operation because the TRACK database is only for abnormal operations.

So, looking at the bottom, we work -- the bottom row is a worker works in their known area, they're allowed to be there, their RQB, no job specific sampling issues here, but something happened, that's an incident, you're potentially exposed, potentially exposed among the highest because something happened, now you have to leave a special sample. That special sample could be positive, and it could be negative. Just because we're involved in an incident doesn't mean you've had an uptake, and that's what really the special in this situation means.

So, workers with the highest potential for exposure, that's what the TRACK database really helps to identify. You've work in an area, your RQB

says there, something abnormal happens, you're in an incident, you get tracked by this TRACK database, you leave a special, and you have your exposure as being positive or negative. So, workers who experience some abnormal operation during the work shift that call for a special bioassay are potentially exposed, and they're potentially exposed among the highest because of the incident. So, workers with the positive bioassay results, whether it's routine, job specific or specials, they do represent the highest exposed workforce.

We want to make sure that they're in our coexposure model for -- for claimant favorable purposes.

So, one area that I wanted to go back, when we talk about no entry into the TRACK database, SC&A did an analysis to try to identify if the TRACK database captured all the positives, and they noted that -- that it didn't. That was not the purpose of the TRACK database. It's not there to identify all the positives. It's only there to track the incidents. It's a subtle way of basically giving a misleading application that somehow the TRACK database has got issues, and we shouldn't be able to use it. But I think from the discussions we had earlier, that's been asked and answered.

The other aspect is, I think it's really important that there was a lot of discussion that somehow the database is able to identify what a job-specific bioassay is. There is nothing in our databases that specifically state that a bioassay is routine or job-specific. Because a job-specific is part of the routine. What's in the database would be this is a routine sample or this is

just normal or it's a specific bioassay special. We can identify the specials, we can identify the routines, but there's nothing that sits there and says, well, we've got to only look at job specifics and go backtrack for an RWP. The data has never supported that, but there's been an impression that somehow that type of questioning can be answered -- that type of question can be answered, and it simply can't because the data has not and never has had that ability to do this. So, that's one of the other misleading things I wanted to verify.

So in conclusion, Report 92 demonstrated that unmonitored workers worked alongside monitored workers meeting the original intent of to determine representativeness. It's a key criteria necessary for developing coexposure models. So, the job-specific samples served the same purpose as routine samples and were implemented as part of a routine bioassay sampling program all the way back from 1990 all the way up through the time period we're talking with 1998. This has been corroborated in the SRS communications and SRS procedures. Granted, the confusing language was clarified in 1997 and with interviews with former SRS subject-matter experts. So, we should be able to put to bed this whole issue with job-specific bioassays and recognize that these are just part of a routine sampling program. There's nothing really specific or necessary about these that would warrant us to consider that we cannot do a dose reconstruction.

So, the unreturned job-specific samples from 1997 represented a very small percentage of the overall bioassay samples requested. All 256

workers with unreturned job-specific bioassays were followed up on and none had results. The purpose of the TRACK analysis -- and by the way, that is that the title. There's no acronym, it's just TRACK for tracking purposes -- was to determine whether special samples included in the TRACK database were included in the coexposure files. The NIOSH analysis concluded that 97 percent of the TRACK entries have a corresponding entry in the coexposure dataset, which would mean that additionally, in response to SC&A's review of the TRACK database, NIOSH noted that any attempt to perform a retrospective analysis of the TRACK database was inappropriate or not -- was not appropriate given its purpose as a prospective tracking program.

And there's one more point that I wanted to bring out that I forgot to do it. I'm going to come back right here because we've spent a lot of time talking about the 79 percent value. There are four key assumptions that if we were to look at this and say job specifics were associated with subcontractors, and therefore we're missing information it's incomplete and would lead to a decision of an SEC. The four key assumptions are one, that the 1990 Tiger Team report and the 1998 notice of violation are somehow connected. They are not. They're mutually exclusive investigations.

The 1990 Tiger Team report didn't even address job-specific bioassay sampling. And the whole purpose -- and by the way, what it found was that there were delinquencies, not necessarily things that were missing. In the 1998 notice of violation, it was a procedural issue that people were not

following, which led to some noncompliance.

The second assumption, the job-specific bioassays would have to be only for subcontractor construction trade workers for this to apply. And we know that this red piece of the pie is made up of all workers. We don't know how many are subs, we don't know how many are others, but you would have to assume that all of them are subs, which is not an assumption that can be proven at all.

And then the third one is that these workers that did not submit samples would have to be among the highest exposed group, and we already know that they are not. That's clearly -- that would be with their sampling programs, their procedures. Even the 1998 notice of violation report stated that the site rigorously followed protocols for high-level -- or not high-level -- but for positive plutonium and enriched uranium bioassay results. So, those would be the people most highly exposed. You'd have to assume that these people who were not monitored or didn't leave a sample are the highest exposed, were never involved in an incident. So, that's -- that would be a leak.

And finally, the unmonitored workers, that these workers did not work alongside other monitored workers. Report 92 and other reports we've shown have clearly shown that the people in this group clearly worked along other workers so that we could have applied a coexposure model to their exposures. So, those four key assumptions would all have to stand for us to recognize that there's a group out there that we could not do dose

reconstruction on, and none of those assumptions really are met.

And finally, the one thing about radiation work permits that I wanted to point out, that if we didn't have a single radiation work permit, not one, would we still be able to do a dose reconstruction? Yes, and here's why.

Because an RWP doesn't tell us what workers were exposed to. Their personal bioassay results do, their TLDs do. So, an RWP helps us to put people in areas where other monitored workers might be so that we can apply a coexposure. That would be the application of the RWP. If we don't have it, we still have a lot of bioassay data to create a coexposure model to assign exposures to people who were either not monitored or were never monitored. This is part of the claimant-favorable approach that we do in our dose reconstruction process.

So that would conclude my presentation. I'd be happy to answer any questions.

CHAIR CLAWSON: Thank you, John.

Joe, would you like to comment?

MR. FITZGERALD: Yes, it was a series of statements that John made that alleged misleading statements that I think for the record we have to respond. I mean, you know, it -- it -- it's something that I think is damaging, and we need to make sure that we have, I think, an accurate and representative statement on some of these.

Okay. I'm going to start with the, I guess, slide 14. I think, and I'll paraphrase this, John indicated that either SC&A only cited what it had,

which presumably would be the first year or two of the job-specific sampling procedures, or that we intentionally selected only the early ones and ignored the later ones that, as he termed, listed them as routine. Okay. First off, I did have the first three or four versions of the job-specific sampling 5Q1.1 procedure. I mean, that's what was available at the time on the -- on the database. And yes, these were listed very explicitly as nonroutine job-specific sampling, and in every iteration thereafter was listed as nonroutine.

Now, I don't -- I didn't have the later ones, but I'm not surprised that there were some revisions toward the end. I think it was pretty clear that there were some real issues administratively with tritium workers in terms of they're not leaving bioassays behind. That was 1995. There was the NOV, I'm sorry -- the self-assessment issue from the field office in 1996 that found a lot of gaps in job-specific bioassays. You had the DOE NOV in 1997. So, you know, certainly, there was a lot of things going on toward the mid to late '90s that would have been an impetus for Westinghouse to recategorize and look hard at how they were administering their job-specific bioassay sampling.

I might add that even toward the end of the '90s, I can't remember the exact date, 1999, maybe early 2000s, there's correspondence that indicated that Westinghouse did away with job-specific bioassays altogether. So, you know, yes, there was a lot of evolution going on. However, in the area of interest from our standpoint, which is '91 to about '95, '96, the procedures that we examined were the ones that we cited. So, let me just

clarify that. There was no intentional misleading of the work group or the Board or NIOSH on our citations that referred to these procedures.

The second thing I might address is the -- this is slide 19, this deals with the complaint, I guess it is, that we don't acknowledge that the 79 percent incompleteness of submission of job-specific bioassays is part of a 5 percent of the total bioassays that were involved. I want to read something from the executive summary of our 2022 report, the one that NIOSH is responding to. This is on page 8, the third paragraph.

(Reading): While job-specific bioassays and source terms may be incomplete given these programmatic shortfalls, this is mitigated by considerations such as, one, job-specific bioassays made up only 5 percent of total bioassays; and two, a full resampling of job-specific bioassay results for the second quarter of 1997 found no evidence of intakes.

That's the 100 percent resampling. So, we acknowledge that certainly there are some mitigating circumstances and certainly perspectives that are important, and we put that right up front in our executive summary of the report we just submitted. So, I don't think this can be considered misleading in any way. We are very much in agreement with this.

I'm going to go back to a comment that was made for the end. I was having some trouble keeping up with these, but there was another comment made, let me see. One second.

DR. CARDARELLI: Joe, I know you were looking for that. I just wanted to thank you for reading that out for the record. My point here was

during your presentation, you did not provide that type of clarity, which I think is very important, especially for the members of the public who might be on the phone. They would not have received that context because they may not have that report. So, thank you for putting it in the report and acknowledging it here.

MR. FITZGERALD: Yeah, I wish you would have acknowledged it in your -- in your comment.

So, let me just go on. There was another issue which was framed as misleading, which was our conflating the Tiger Team in 1990 in terms of its finding of no RWPs with a notice of violation that DOE issued in 1998 for the job-specific bioassays not being collected. I don't think there's any confusion nor -- and I made it very clear that the Tiger Team finding in 1990 was the fact that the RWP procedures which were in place with DuPont as well as Westinghouse were not being executed. Even though they were on the books, it wasn't being implemented at that time. That was the comment there. And the comment with the NOV in 1998 was that we don't focus on the NOV. It's the self-assessment in 1997 which, you know, led to the NOV, which is our concern, which is our concern, which where they found the gap in the job-specific bioassay performance, the actual submission of samples. So, we made that very clear, and I'll reiterate that again just to make sure there's no confusion on that.

And there was a final comment, and I -- like I said, I had a hard time keeping up with all these, but I think you commented that you don't need

RWPs to do dose reconstruction. I think that's a paraphrase. We're looking at not whether RWPs are the basis for coexposure models. I understand that issue. It's more the question that was -- that arose with the previous SEC where the Board made it very clear in the basis of the SEC recommendation that the assurance of -- of job-specific bioassays being performed was tied to -- tied to RWPs indicating these bioassays and that they would be in fact implemented. And that's what we've been examining, is more the program assurance aspect of that. And again, that was a takeoff from that particular preceding SEC. So, I want to clarify that. No, we certainly understand that the RWP itself isn't a basis for a coexposure model, but certainly the job-specific bioassays which are designated in that RWP and whether or not they're carried out and actually contributed, I think that that's the important part.

(Whereupon, multiple attendees speak simultaneously.)

DR. CARDARELLI: Can I clarify something?

MR. FITZGERALD: Bob, do you -- do you have something on the TRACK database, or do you want to let that go?

MR. BARTON: I think -- I think John had a comment.

MR. FITZGERALD: Oh, okay.

DR. CARDARELLI: Yeah, two things. On the 1990, that's a 1,300-page report, so there's a lot of great information in there, and it really is -- job-specific bioassays are not addressed in the context that they are in the 1998 notice of violation. Also, on the RWPs, and I'll tap into Tim to verify

the statement I'm about to make, is they're not specifically, they don't state you must leave a job-specific bioassay. That's part of a protocol. If it's not on their RWP, then they leave a job-specific, but the RWP does not state all workers on this RWP should leave a job-specific bioassay. So, I just wanted to clarify that, that RWP does not specifically identify when a job-specific should be done. That's part of a protocol that the workers should be following, and they failed to follow, and that's why DOE got fined for failing to follow their procedures, not for a compliance issue on dose requirements.

DR. TAULBEE: This is Tim. If I could add one -- one little component to this, because Joe, when you were doing your presentation, I -- I made a note as well, you know, from one of the things that concerned me in what you said. I was certainly left with the impression that you were saying RWPs were required for dose reconstruction to be feasible. That's the note that I wrote down here. And I liked -- I mean, what John's response is, is absolutely correct. It's not. The purpose of us looking at these RWPs initially was solely for representativeness, and could we identify that the same workers, one monitored, one not monitored, were working on the same RWP at the same time. And we went through that, and you all went through it in your presentation. I mean, Ron Buchanan went through that. And clearly to me that has been established.

And so, the RWPs themselves were used for that evaluation. They're not required for dose reconstruction. We used them in this particular case to establish that these unmonitored workers that should have left job-specific

bioassay and didn't worked alongside the workers who did leave bioassay. And so, I think that's an important point that I hope is now on the record. Thank you.

MR. BARTON: Well, this is Bob here. Yeah, I don't know that we've ever said that RWPs were necessary. I agree with you. This was the mechanism for us to find out whether these job-specific bioassays, which then were largely not submitted and they are a small portion of the total monitored workforce, were represented in the population that would be used for a coexposure model. And frankly, I mean, I try to think about this a little simpler, because it seems like we're kind of quibbling over verbiage -- verbiage. You know, you're constructing a coworker model and the question that we are trying to answer or we're -- the work group is asking is, is there possibly a population out there, some subset, and I -- I don't think it matters whether it's 3 percent, 5 percent, or 0.5 percent that is not represented and could potentially have higher exposures. And that's how we got to this entire place.

There was the finding, not by us, but that the job-specific program was not functioning as it was intended to. And so, then we asked the question, well, could they be different than the rest of the routinely monitored population? And here's where we get into, again, terminology. But job-specific was used, again, for those workers who weren't on the prescheduled routine program, and they were going to do a job. It requires a certain source terms that was going to be present, and thus job-specific is

utilized in the field to make sure those workers are covered.

And so we say, okay, there's clearly an issue with the job-specific, a small proportion of the radiation worker population, for any reason that we think there's potentially -- there are higher exposures. And while we can't say that definitively because we don't have that bioassay data, the logical conclusion, at least to me, is that often this job-specific mechanism would be used for workers who -- that would be subcontractors.

Now, I agree completely with John that it's not solely subcontractors. But I don't necessarily see how that's relevant. We felt that it would be mostly targeted at intermittent subcontractors for possibly short times and could have been exposed to more -- more highly contaminated areas of the site doing things that are not routine, such as just regular glove box work, that I'm sure the majority of the monitored population had more regular and routine exposure potential, and thus I think this is where it gets confusing about job-specific to nonroutine jobs. So, it's nonroutine for the worker, and how we get to subcontractors is it's logical that they were the ones that would be affected by this shortcoming in the job-specific value.

I also have some comments on the TRACK commentary as well, but I'll stop there for now.

DR. TAULBEE: If I may add to what you just stated there, Bob, that's part of why we went through Report 92 the way that we did with a random sampling of the RWPs. So, it covers all. It's not just focused -- well, in fact, it focused on all subcontractor construction trades work, and so we looked at

all of them within that time period, a sample of them. I'm sorry, not all of them, but a sample. And so, to make that assumption that these missing job-specific RWPs predominantly applies to the subcontractor construction trades workers, you can make that assumption, but Report 92 went through and evaluated it. We went through and we looked at those subcontractors that were not monitored, and were they working with monitored workers? So, the only way for this to really impact is if those other worker -- or everybody on that RWP was not monitored. All of the subcontractors on that RWP were not monitored, and that's not the case. That's not what we saw. We saw that those workers were working alongside monitored workers.

MR. BARTON: That's correct. And I think we're really trying to focus in on Report 92 because that was the litmus test to the entire question. Now, as John also specified, and it's completely correct, there's no magic number. There's no magical fraction where, you know, you can say, you know, that's -- that's really a judgment call. So, I agree with you completely there. And that Report 92 was -- I mean, we designed it in concert, putting together the sampling criteria way back in 2019 or 2018 or so, and I agree -- I agree with that.

Now, there's obviously some questions that are out there about whether the person was actually working reasonably close or in the same exposure potential as the unmonitored worker, and I think that's the entire discussion here, and it is a judgment call. But I agree with you that Report 92 is really where the rubber meets the road.

Just quickly regarding the TRACK discussion, perhaps I just wasn't -- didn't communicate well enough, but SC&A acknowledges that this is essentially a database of incident-driven situations. I mean, I thought I made that clear, but our conclusion was basically -- and it's the last bullet on, let's see, slide 13 of SC&A's presentation, the TRACK database would not reflect internal exposure potential to subcontractors who were not routinely monitored or did not submit required job-specific bioassay.

So, while it's -- it's useful in tracking incidents for those that were monitored or there was a suspected -- suspected intake, again, we're talking about a missing subset of the monitored population. It's missing. We don't have it. We have no idea what that data would have said had they submitted their job-specific bioassay. So, I think we're just pointing out that we have missing data. The TRACK database doesn't really get us any closer to understanding what that data would have shown us had those workers submitted their samples. And that -- that was really my only point. DR. TAULBEE: Again, this is Tim. To get to the point that you're saying that those data were missing, Bob, one, you'd have to -- an incident had to have occurred that nobody noticed, for one, that there was nobody -- that didn't do any of those triggers. That seems highly unlikely within this work. When you look at those RWPs, there's almost always an after-action, a survey that's going on when you go through and you read all of those.

But again, you're missing, or I feel like you're missing, the point of Report 92, in that we were -- these missing job-specific bioassay are from

jobs where other workers on that job were monitored. And so, if there was an upset condition or if there was something that went wrong, those other workers would, A, show up from a bioassay standpoint, or the whole group would then be monitored and you would get a special bioassay. So, a lot of multiple failures would have to occur in order to get to the point that you're talking about, of the subcontractors who were not routinely monitored or did not submit the required job-specific bioassay. Remember, Report 92 went through and evaluated those people who did not submit those -- those job-specific bioassay, and we found that they worked alongside workers, predominantly, who were monitored. And so that rounds out the whole basis for our coexposure model, that it is valid.

MR. BARTON: Well, I think, Tim, you'd still admit that even Report 92 doesn't show 100 percent that -- well, and again, it gets into kind of quibbling over what is a representative monitored worker with an unmonitored worker on a given job. I mean, is it a (indiscernible) during the morning and a pipefitter in the afternoon, that sort of thing. So but again, it's a judgment call. It's a judgment call.

And I absolutely agree with you that what Report 92 tries to get to is, are -- would these people be covered in the distribution of -- of exposures that weren't actually caused because the job specifics weren't being submitted by some of those workers. And again, that's a judgment call, and as John said, there's no magic number to it. It's -- it's -- it's a professional judgment. Unfortunately, there's no -- I wish there was a magic number,

and I think we even tried to get to a magic number many, many years ago that would satisfy this question. But I mean, the question is, do we have a subset of workers out there who weren't monitored and who would not be represented -- again, that's the correct term, not represented in any subsequent coexposure model.

DR. CARDARELLI: And Bob, I think our analyses show that -- that there is -- that no such category of worker exists. We are able to, with our tens of thousands of data points and the assessments, to provide claimant-favorable assumptions to the dose reconstruction, to assign doses, to even workers who may not have left the job-specific bioassay because they are any worker at that site who may have fallen into that category.

CHAIR CLAWSON: Okay. I -- I've got a question, and this one's for John and Tim. Under the law and criteria, what qualifies for an SEC?

DR. TAULBEE: Sorry, coming off of mute there.

CHAIR CLAWSON: No problem.

DR. TAULBEE: Under the law, what it states is that NIOSH lacks sufficient either personal monitoring, air sampling mon -- or workplace monitoring, which can be air sampling monitoring or contamination surveys, or source term data, to either bound the dose with sufficient accuracy, or bound the dose -- I'm sorry -- or estimate the dose more precisely than a bounded dose. What we're really looking at here is, can we bound the dose? And when you look at IG-006, that's one of the criteria for using coexposure sets, is -- are, basically, the highest exposed individuals at the site included

in the coexposure model? And when they are, yes, we should -- we are able to bound the dose.

CHAIR CLAWSON: Okay. Thank you, Tim.

And Bob, you agree with that? Bob Barton?

MR. BARTON: Well, that -- that's the entire question before us.

CHAIR CLAWSON: Okay. I want to make a statement here because this is something that just really has gotten underneath -- and I want you guys to stop and take a look for just a minute how many years, how many different processes, and when you start to say in the most claimant favorable, why don't we say our best guess? Because to me, that is what we're totally getting into, and we're totally missing that point. There is so many holes in this, and there are so many problems with this. Yes, you can bound this, you can throw all of these, but you're having to make a heck of a lot of assumptions to be able to get there.

And I do not understand how come the part of the law that is for the people, the SECs, are being fought so hard. It makes no difference to me. This is what the law tells us, but I want you to take a look at how many years we have spent just on this subcontractor. Because we've cut away to be able to try to come to a conclusion on this. And you can say what you want. You can use these really great catchphrases of claimant favorable, overarching, bounding, all of this other stuff, but it comes down to just our best guess.

Now, I in no way am saying that you have not done a fabulous job.

Because you have gone to great lengths. But I don't understand why we are fighting these SECs so terribly. I really don't.

The other thing I'd like to know, and this is for John. What is the criteria to be able to get on the TRACK database? What procedure do they use to be able to have events or whatever? What was the criteria to be able to get onto the TRACK's database?

DR. CARDARELLI: That criteria was that something abnormal occurred during the work environment. Anything unusual. So, any incident, anything.

CHAIR CLAWSON: So, how was that enforced? Because I'll tell you, just from my life, not everything gets into that. If it's caught, if it's caught in a problem or anything else like that, they -- they have to proceduralize ours to no end to be able to get the reports to be able to do it. Is there a procedure for evaluate -- for putting onto the TRACK's database, and what's the procedure? I mean a procedure from Savannah River.

DR. CARDARELLI: I can't answer that one right now, but I can say this. Any worker who left any bioassay, whether it was routine or -- or special and -- and came up positive, is involved and included in our coexposure modeling. It doesn't really matter whether they're on TRACK or not.

CHAIR CLAWSON: And that's very good. I just want you to realize that this TRACK database was a way of trying to -- because from the Tiger Team reports, all these other reports that come and find out, there was no

way -- there was no monitor -- there was no system put in place for small accidents and so forth. And it -- it created its own little problem.

But John, let's talk about your subject-matter expert. Who was that?

DR. CARDARELLI: We had three.

CHAIR CLAWSON: Okay. What was your big heavy hitter? What's his name?

DR. CARDARELLI: Well, would you consider that to be [identifying information redacted]?

CHAIR CLAWSON: Yes. Okay. What was [identifying information redacted]?

DR. CARDARELLI: Well, I'm not going to go down that track. If you want to ask questions about [identifying information redacted] and investigate, invite him here --

CHAIR CLAWSON: No. Here, I'll -- I'll -- I'll help -- I'll help you out then, because I want to get to a point on something like this. Because I've had a problem with this for a long time, and I'm going to air it. He was the [identifying information redacted] for Savannah River. This was his job. He also writes straight based and also said that he did not agree with the notice of violation. And he fought it pretty hard with DOE. It says it right there in his reports.

Could there be any kind of bias trying to prove representative of his work that he did this many years; yes. And I'll say that for you. That's why I can't do certain things on INL, because I possibly have that.

DR. CARDARELLI: Well, that's why --

DR. TAULBEE: Mr. Clawson?

CHAIR CLAWSON: Yeah?

DR. TAULBEE: I need to interject here.

CHAIR CLAWSON: Sure.

DR. TAULBEE: For one, we should not be going -- identifying or calling out individuals the way that you did. But this is exactly why we did additional subject-matter experts, was to confirm it. So, to claim that there's bias when there is none is, I think, inappropriate, sir.

CHAIR CLAWSON: Okay. Well, Tim, let's go back to his waiver. I believe the legal term on the paper said nobody else can do it. So, yeah, you see what my problem is, and you've always seen what my problem is there. And I appreciate that you don't like calling it out, but you guys also called out his name too, so remember that. And when you bring that forth to me, you have another issue there.

MEMBER ZIEMER: Okay, Brad, this is Paul. Can I make some comments here?

CHAIR CLAWSON: Sure.

MEMBER ZIEMER: Let -- let me start out by saying, Brad, I don't believe we're just doing guesswork here. I -- I know that sometimes it feels that way, but, in fact, there's two things here. One is we are doing what is required by the law. That is one of the issues that always occurs when you have science and public policy at the same time. The public policy is based

on the need to address the issues of the workers. And at the same time, this -- this program is required to use scientific methods to determine that -- that that is done in a way that, in a sense, is fair, so that not everybody who worked at a site but got below some level, let's say, has a valid claim.

Obviously, the SEC is designed to handle those situations where there's not adequate information through what Tim described, either the dose reconstructions on the individual or the bounding. We all know that bounding, as claimant favorable as it is, you could always argue that there may be a person or two whose dose was higher than the bounding. But by and large, we're talking about uncertainties that get built into the science. We never know exactly on anything, whether you are talking about the exact time of a swimmer in the Olympics, we have a value. There's always some uncertainty.

So, whatever -- whatever scientific method is used, there's going to be some uncertainties. We're trying to minimize those by the bounding process. And the process really is a fair process to the workers. We can argue about whether we have gotten the right bounding, but and that's why we look at all these factors. But we are not trying to make guesses. We are trying to do a fair job of bounding, and I think we should acknowledge that.

Sometimes it does take a long time because these are complex sites. The data sets are complex. There's all kinds of variables that affect the -- the accuracy to which you can do that bounding. But we -- we are -- we're trying to do our best, and I think we're trying to eliminate bias whenever we

can. So, I -- I just want to -- to make sure that we understand that this is not a stab in the dark. We're trying to hit that bull's-eye as close as we can within the parameters that we have available to us.

That's why we have SC&A to help us. That's why we have the NIOSH group, which is outside of the DOE, to help us. So, and that's why we have the Advisory Board. So, we're bringing in a lot of views. And I understand -- I think I understand, because I've worked in the field at Oak Ridge, and I -- I know what you're talking about when you say that not -- not everything -- workers don't always want to let people know when they screw it up. So, but we try to find ways to minimize that as well as to maximize our ability to come up with a fair answer.

So, I -- and you know, I want us to respect both sides of this. The work that SC&A does is important to us as a Board, and the work that NIOSH does is important to us as a Board.

CHAIR CLAWSON: And, Paul, I --

MEMBER ZIEMER: And with that, I want to ask John a question, and maybe Joe, too. It sound -- it sounds to me like SC&A is suggesting that there might be some year between 1990 and, say, whenever, where we would all have the confidence that dose reconstruction could be done. I think NIOSH—and this is what I wanted to ask John.

John, is NIOSH's position at this time that you feel that bounding -- I should have said bounding before -- bounding can be done starting in 1990, or are you not prepared to say that yet?

DR. CARDARELLI: No, I believe we can say that. We've made those conclusions in all of our reports.

MEMBER ZIEMER: And -- and Joe, is SC&A suggesting that it may not be '90, but it may be in—

MR. FITZGERALD: Yeah, I think the --

MEMBER ZIEMER: -- what -- what was sort of --

MR. FITZGERALD: Yeah, I think the --

MEMBER ZIEMER: -- built into what you were saying?

MR. FITZGERALD: Yeah, what I was saying was that, you know, given the basis for the Board's SEC decision, recommendation, it was a combination of data completeness in terms of job-specific bioassay information, as well as evidence of program assurance, meaning that, in fact, the job-specific bioassays were being required and -- and executed. And I think what I was saying earlier was, based on a combination of that information, which we, you know, addressed in our conclusion five, how one would balance that, I think 1992 to about 1995, in that three-year time period, is where I think the amount of information would be sufficient to support a coexposure model.

Now, we haven't gone any further than that because, as John was saying, I think NIOSH's position has been all along that it has the sufficient data now, starting the very beginning of the period, 1990. And we believe that that's not the case. I think the rollout of the -- of the new job-specific bioassay program as part of the RWPs and what have you, and

Westinghouse with its radiological improvement program, we just don't see the evidence of the bioassays being sufficient enough to add to the representativeness that the coexposure model would need to have on day one. I think certainly by 1992, one can make that argument. I still think there's a little bit of review and judgment needed in that early 1990s period.

I think it's tractable. I just don't think it's either -- on either extreme, which is, you know, on day one, 1990, nor necessarily 1996, when we have a pretty good assurance that there were no exposures that might exceed whatever bounding value the coexposure model comes up with. So, I think it's narrowed down. I just can't tell you specifically what would be, you know, an appropriate milestone within that time period. But it's a relatively small time period.

MEMBER ZIEMER: Yeah, I wasn't asking for specific data. I just was trying to get a better feel for sort of the direction that SC&A felt they were headed. Thanks.

DR. TAULBEE: Paul, a lot of --

CHAIR CLAWSON: Well, this is -- this is Brad. I was going to bring up what we've got at the end after we went through this, but Tim's got his hand raised, so I'll let Tim.

DR. TAULBEE: I just want to clarify that NIOSH's position is that starting January 1st of 1991 is when we feel that dose reconstruction is feasible here. The current SEC goes through December 31st of 1990.

So, I just wanted to clarify those points. That's all. Thank you.

CHAIR CLAWSON: Well, where did -- Tim, where did that date come up? I haven't seen that one from you guys. What -- I didn't see an official, this is what we feel where it's at.

DR. TAULBEE: Well, the Agency has already and the secretary has already ruled on the previous time period, which establishes the class up through December 31st of 1990. And so, what we're saying is that we believe that dose reconstruction is feasible from January 1, 1991, through the end of the SEC period, which is, I believe, December of 2007.

CHAIR CLAWSON: Okay.

MR. FITZGERALD: Yeah, we agree. I'm sorry. That was a misspeak on my part. It's January 1, 1991.

DR. CARDARELLI: To go along with Paul's question and Joe, yours as well, I think the next presentation will be very helpful to looking at those time periods and the data as well. So, I would think you might want to ask that question again after the next presentations are done.

CHAIR CLAWSON: Okay. And that's -- that's a very good point. Thank you, John.

So, Lockey, you were raising your hand. There's a button down there. I know that, technically, that's hard for you, but do you want to speak now, or do you want to listen to these next two presentations and then have -- have your question? I -- I just -- there's -- there's still more to go.

MEMBER LOCKEY: You all right, Brad?

CHAIR CLAWSON: Yeah, I'm fine. I'm fine.

MEMBER LOCKEY: I want to ask a question of John for a second. John, in the -- in the TRACK data, was there any bioassay data that -- that exceeded your proposed dose reconstruction? In other words, were there any outliers in that data?

DR. CARDARELLI: I can't speak to that. I -- I -- I'll lean on anyone from ORAUT who may have worked on that TRACK database. Can you speak to that question?

DR. CHALMERS: Dr. Lockey, can you ask your question again to make sure I understand what -- what you're looking for?

MEMBER LOCKEY: I was looking at -- you know, we were looking at the -- helping to use that data to -- to set exposure limits in the dose reconstruction in relationship to the upper exposure levels.

(Whereupon, background noise interference occurred intermittently from Chair Clawson's system.)

MEMBER LOCKEY: Was there any data in the TRACK data that exceeded what you had proposed previously?

DR. CHALMERS: We didn't look at that. We only looked to see if bioassay results were collected in response to this incident that went in the TRACK database. Were they quote/unquote compliant or not in terms of receiving a sample within a certain amount of time. We didn't look at the, you know, actual results and how high they were or anything like that, not for the TRACK database.

MEMBER LOCKEY: Would you -- would you have used those results in

setting your upper limits?

DR. CHALMERS: You mean when we go to make a coexposure model?

MEMBER LOCKEY: Yes.

DR. CHALMERS: I don't know that we used them to set upper limits necessarily. They would obviously be included when we make a model.

And they, you know -- ideal -- you would think that since they are the people with the quote/unquote highest exposure potential, that they would be amongst the largest results when we go to make a coexposure model. So, they would be included along with the rest of the routine results, all however many hundreds of thousands of them are in the databases we would use.

MEMBER LOCKEY: Yeah.

DR. CARDARELLI: 97 percent of the TRACK database is actually included right now in our proposed coexposure model.

MEMBER LOCKEY: John, would be -- I'm just looking at this from a scientific perspective. It would be interesting for me to -- to include that data and then exclude it and look at the differences to see if it made an impact. I mean, I'm just -- that's a scientific interest of mine because it --

DR. CARDARELLI: Yeah, I -- I think that's something that we can do fairly quickly. Keep in mind there was only 1,800 entries in that very small TRACK database, and we're talking hundreds of thousands of bioassay samples. So even if it was, I don't think it would make an impact, but we can certainly exclude them and then rerun it.

MEMBER LOCKEY: If it did make an impact, that would be interesting for me.

DR. CARDARELLI: Yes, it would. Yes.

MEMBER LOCKEY: I would think it would not make an impact, but I'm asking that question. And the second question, John, can you go back to your slide 20 again? Because I just need to make sure I understand this -- this slide.

DR. CARDARELLI: Let me bring that up. Slide 20?

MEMBER LOCKEY: Slide 20. Yeah, that one, the pie chart. Yes, that's correct. So, and -- and Joe, would you kick in on this too, both you and John? I guess what I heard you say, John, was that all these, and the routine submitted, and this should just be one pie chart. Job-specific bioassay and routine are considered the same. That's what you were saying?

DR. CARDARELLI: Yes.

MEMBER LOCKEY: Okay. So that -– and, Joe, do you agree with that?

MR. FITZGERALD: Well, I think we were on the record. Certainly the way the job-specific bioassay program was prescribed and defined in Westinghouse's procedures for the first half of the '90s was as a nonroutine program to the extent that it was very clearly defined as nonroutine with memos that described why it was considered nonroutine. So, it wasn't simply a category. It was actually an explanation as to why it needed to be considered nonroutine. And that is pretty clear.

I mean, I don't -- I don't -- I don't understand why this seems to be constantly in debate. I can provide the Westinghouse memorandum that goes through and -- and justifies why it needs to be considered nonroutine versus routine. They actually had some issues when some facility managers considered these as routine versus nonroutine, and there was some mix-ups and problems. So, yes, I disagree with this broad label. And, again, I just go back to Westinghouse's procedures as well as memorandum on the subject of routine versus nonroutine. It's all documented.

Now, it did shift, and I think John was quite correct. It did shift later in the '90s, but I think that was as much in recognition of some of these issues that arose in administering the job-specifics as a routine program, and after some of the self-assessments and NOVs and what happened, that was -- that was changed. So, I'd be glad to provide the work group, as we did some years ago, copies of the correspondence on this question of routine versus nonroutine.

It's -- it's been pretty well, you know, hammered out. I mean, it -- this is not a new issue.

MEMBER LOCKEY: I know it's not a new issue. I thought -- it wasn't clearly answered after John went through his review whether your position had changed on that. It seems like it went through a revision or changed after revision 3 or 4.

MR. FITZGERALD: Yeah, mid-'90s, '95, '96, administratively they -- they -- they shifted the categorization to the routine bucket, but I think

there was some compelling reasons administratively to do that. But there's also correspondence, which I think is very illuminating in that same time frame as to what they were doing and why they distinguished routine versus nonroutine. I'd like to provide that to the work group, but I think rather than our trying to interpret it, I'd just as soon use the source documents.

MEMBER LOCKEY: That'd be great.

CHAIR CLAWSON: Well, and if you look at this slide 14 right here, just look through the years there. They're still trying to figure it out themselves. There's no cut and dry thing there. This is -- this is -- this is part of the RWP program implementation and trying to get what they create to be the best. They really do. And this is, you know -- I think this slide shows you right there. They're still trying to figure it out.

I'd also like to tell Paul, thank you as always for your input and your calming demeanor and so forth. I do agree with everything that you said there. And there's also another part to it too. We have an obligation to the workers. I look at myself as a Board Member as being responsible for all the scientific part of it to be able to get the best that we can. But the bottom line is -- is the whole reason we're doing all of this is for the workers that have done this. We're trying to give them the best.

And ultimately it comes down as work groups here, we give it the best shot we can and then we put it out to the full Board and let them make the decision and go from there too. So, I appreciate that input, Paul. You -- you have always -- always been a source of -- of -- of calming demeanor

and also -- and I apologize if I feel frustrated, but it's been a lot of years on this work group. But --

MEMBER ZIEMER: Well, Brad, we all get frustrated --

CHAIR CLAWSON: I know.

MEMBER ZIEMER: -- time to time. Yeah, --

CHAIR CLAWSON: I actually, --

MEMBER ZIEMER: -- I --

CHAIR CLAWSON: I actually, --

MEMBER ZIEMER: I want to add one other frustration. I see David Pompa is on the line. And I'd like to ask whether David Pompa is allowed to discuss or vote in this work group.

DR. ROBERTS: Hi, Paul. This is Rashaun calling. He is in listen mode only, so.

MEMBER ZIEMER: Okay. I just want to put it on the record that I object to that. And I also -- in fact, if we have any votes, I will abstain.

I'm not going to vote if my colleague will not vote.

DR. ROBERTS: Okay.

MEMBER ZIEMER: And I -- I -- I think it's unfair. I don't know if we have any counsel on this call, but it's very unfair for an appointed Member of this committee to be -- and he's not conflicted as I understand it, on this work group, it's unfair for him not to be able to participate. I think all of us should be objecting to that. And Brad, I hope you -- hope you will object to that as well. That's very unfair.

CHAIR CLAWSON: Paul, I agree with you 100 percent. And Rashaun can testify --

MEMBER ZIEMER: I know Rashaun cannot do much about this.

CHAIR CLAWSON: I know, but I've had some very serious conversations with Rashaun on this. And I -- I -- I just want her to know that, yes, I -- I agree with what Paul is saying, as I've said to you many times, because it's been very frustrating to me, Paul. I just -- I am not as professional as what -- what you can put it. And I agree 100 percent with you.

MEMBER ZIEMER: Well, I don't think it's a matter of being professional. It's something going on that is not fair to this whole Advisory Board. And I hope some outside people like Denise DeGarmo will take note of this and make objections as well. It's something is going on behind the scenes. And I don't know if it's political or what's going on, but this is very unfair. So, that's off the -- off the topic of what we're talking about. But I did want to ask, Brad, at some point if we can take a break.

CHAIR CLAWSON: Yes. Before we go and -- but first, Paul, thank you. I -- I've had plenty of private conversations on this exact same thing. And I don't know what it is either. I don't know where it's coming from. But I agree with you 100 percent.

If we could take a 15-minute break, comfort break and stuff, if that's all right with everybody, and return at that time, and we'll finish out these last two presentations. Is that fine, Rashaun?

DR. ROBERTS: Yes, so return around 2:00 p.m. Eastern.

CHAIR CLAWSON: Eastern, yeah, there you go. Okay. We'll return at 2:00, and we'll go from there. Thank you.

(Whereupon, a break was taken from 1:46 p.m. EDT until 2:00 p.m. EDT.)

DR. ROBERTS: Okay. I have 2:00 p.m. Eastern. Is the court reporter back on?

THE COURT REPORTER: Yes.

DR. ROBERTS: Okay, you can hear, okay. Let me do a quick roll call with the Board Members -- work group members, rather. Clawson, are you back?

CHAIR CLAWSON: Yes, I am.

DR. ROBERTS: Okay. Lockey?

MEMBER LOCKEY: Here.

MEMBER POMPA: Pompa?

DR. ROBERTS: Okay.

DR. ROBERTS: And Ziemer?

MEMBER ZIEMER: I'm here.

DR. ROBERTS: Okay. And as I stated earlier, David Pompa is in listening mode, if he's on. Okay. Back to you, Brad.

MEMBER LOCKEY: Brad, Jim Lockey. Brad, can I ask you a question?

CHAIR CLAWSON: Ask me a question?

MEMBER LOCKEY: Yeah, I want to ask you a question.

CHAIR CLAWSON: Sure.

MEMBER LOCKEY: Why -- This is the first I knew that David couldn't participate. I guess there's no explanation for this for the Board?

CHAIR CLAWSON: I -- I don't -- no. I -- I have asked many of the questions, and this will have to come from Rashaun. And I know that she's been working on it for quite a while, and all I know is that they can't. I -- that's all I know. And I know that I don't know why, period. That's it, Lockey.

MEMBER LOCKEY: All right. I just wonder. I understand it. All right.

CHAIR CLAWSON: Okay. And all of us are a little bit frustrated about it because I think that it really hampers our -- our ability to be able to form the tasks that we've been asked.

With that being said, next on the agenda -- unless Rashaun, unless you want to respond to anything, I'm sorry.

DR. ROBERTS: No, unfortunately, I can't provide any additional information.

CHAIR CLAWSON: I figured so. So I didn't want to -- but I just want to make sure.

So, we're going to SC&A has their presentation. I'll turn it over to you.

SC&A PRESENTATION: EVALUATION OF FEASIBILITY AND UTILITY OF SUBCONTRACTOR EXPOSURE POTENTIAL COMPARISON

MR. BARTON: Okay. All right. So, this is our evaluation of the

feasibility and utility of a comparison between subcontractors and prime contractors. That's kind of a confusing title, but hopefully it will become more clear over the course of this. Let's see here. Okay. Just a little bit of background. Again, this is just going to be a few slides because I know NIOSH has considerable work related to this, but the last meeting of the work group was back in March of 2023, and the work group had requested that SC&A, perhaps in conjunction with NIOSH, explore the possible analysis that would compare the exposure potential of subcontractors to prime contractors, which is sort of an underlying question here.

We did give somewhat of an update presentation to the full Board, but that was really just to tell the Board that we were looking into it. And then subsequent to that, we submitted a memo that was evaluating, again, the feasibility. In other words, what data is available for us to do it or for NIOSH to do it, and what utility, does it -- is it going to answer the memo essentially?

So, let's look at some exposure data or subcontractors that we can identify and prime contractors, and let's see what differences there may or may not be. So, the available data. There's a suite of data files provided by NIOSH, but ultimately gotten from the site SRS, and it's called SRS ProRad. There are 27 total data files of -- all having different purposes and different information. We were able to eliminate 19 of the 27 pretty much right out of the gate. Most of those were just -- just because they're out -- out of period. I mean, we're looking at '91 and on. And so, I mean, if it's a data

file that only deals with the 1970s, it's of no use to us.

One of them was specific to tritium, and per previous discussions between NIOSH, the work group, when we wanted to do these types of analysis, even the Report 92 analysis where we're trying to establish representation, that tritium was really not something we were going to keep on our radar. It's not salient to the evaluation. And then a few more of those 19 files that were excluded just didn't have any actual dose information. So, obviously, not pertinent to any sort of attempt to compare the two populations. And again, the request was for subcontractors versus prime contractors.

So, you have the remaining eight files that could potentially be used for exposure comparison. One -- one of them was especially useful because it allowed for identification of who was a subcontractor. In other words, we would get a name and social security number, and it would give lists for the -- essentially, the job title or employer subcontractor, which is obviously going to be very useful in any sort of comparison.

Now, we had two that contained internal dose information, so that would be your in vivo and in vitro measurements. Four of the eight contained external dose information, which, I mean, could be useful in any sort of analysis. But since we're talking about missing bioassay, not as important as the internal. And then one of them contained incident information. And this is different from the TRACK database. This is a separate -- separate item.

All right. So, SC&A identified that the file as most relevant is this is the SRS_indv_nontritium_legacy. And so, this contains basically the available electronic bioassay results during the period of interest. And based on one of the previous files we -- we used to be able to separate subcontractor and prime contract workers. Again, that was based on social security number. It should be fairly accurate. So, when we look at this database in the time period of interest, and well, during the time period of interest, there are almost 240,000 samples that could be used for any sort of comparison.

We did not include in that total when we're doing -- again, this is a feasibility study, not actually performing a numerical analysis of the bioassay results. But based on that, of the 238,491 bioassay samples, we didn't include any baseline samples because that would not be reflective of any work at the site. We left out fecal samples. That was a very small proportion of the database. And so, probably not very helpful. And again, only the samples from '91 through 1997 were considered relevant.

And just as a side note here, sometimes the void date for the urinalysis result was not provided. And so, to sort of delineate whether it was part of this time period, we would just use the received date and include that sample in that tabulated number, the 238-plus-thousand urinalysis results.

But your results included a trivalent, neptunium, plutonium, strontium, and uranium. So, really your major players. The prime contract workers

made up between about 80 and 90 percent of those bioassay results by year. So, it'd fluctuated year to year, but the range was 80 to 90 percent were prime, and so the remainder would be the subs.

As far as a potential path forward, we pointed to an analysis that was done related to the Los Alamos National Laboratory by ORAU, NIOSH/ORAU. And that was, again, a comparison of different worker categories. Not -- in that case, not subs and primes, but different branches that operated out at Los Alamos. And the benefits of this analysis that had already been performed and looking forward towards the feasibility of something similar at SRS, the benefits were that it's rather simplistic to just compare the magnitude of the bioassay results for those different groups. And, you know, since NIOSH had already performed a similar statistical analysis for Los Alamos, you know, the mechanisms were presumably still in place that they could do it rather easily for SRS.

The drawbacks. It does not account for what has been termed data dominance. And this is something that discussions go back 10, 15 years really at this point, in where you would have in your distribution a large number of samples possibly assorted -- associated with just a few workers. You know, if you had some sort of intake and a single worker submitted, you know, 30 different bioassay samples during a given period, it would dominate the distributions. So, the way that's dealt with in coworker modeling is something called a time-weighted one person, one statistic, or TWOPOS. And so, we're pointing to that since that would be the coexposure

mechanism. That would be the preferable way to analyze the data rather than just comparing the magnitude of two different groups without considering that some workers might have only submitted one and some might have submitted quite a few.

Also, the LANL analysis, didn't really separate it into individual time periods like -- like a year. It was just the period under evaluation. So, it's usually good to be able to look at these things on a year-by-year basis. And then this one's particularly important. Just looking at the database, something like 1 percent of those samples in those 240 hundred thousand were actually positive. So, there's a lot -- lot of negative results in there. So, it sort of -- there's the issue of what are we going to really be able to glean doing this type of analysis, you know, even considering the fact that we're talking about a data gap for the job specifics.

So, onto the utility, which, again, was something that the work group asked us to look into. Again, the previous SEC, 1972 to 1990, was established based around this uncertainty around the actual collection and analysis of job-specific bioassay. And in particular, we've been talking about the radiation work permit analysis that was done in Report 92. And our concerns, SC&A's concerns, are we can -- you can evaluate the bioassay data that you have, but does it really reflect what the primary SEC issue under discussion is? Because we're talking about uncollected job-specific bioassay. So, what would it really inform about exposure potential differences between the groups we're talking about?

And here again, while we can identify subcontractors in the data set, we can't tell whether they're job-specific. And there's been a lot of discussion about the term nonroutine. So, I'll just say job-specific in-the-field assigned samples rather than, you know, routine samples that are at a set date that aren't specific to any job. They're just what happens on a routine basis, whether it be year or even more common for isotopes like, you know, like strontium or something like that. And we expressed these reservations again back in March when this subject was brought up during the work group meeting.

So, well, again, quick conclusions here. There is an electronic dataset available, which we're about to hear about from NIOSH's presentation, I surmise, that contained internal and external dosimetry records and that allowed for identification of subcontractors and prime contractors, but no way to delineate job-specific, which John pointed out during his presentation. And again, there's almost 240 hundred thousand bioassay results; however, about a quarter of a percent were actually registered as positive. And then again, 80 to 90 percent were for prime contractors.

So, the remainder by year will be, you know, somewhere between 10 to 20 percent for subcontractors.

We also concluded that we really want to do, as I had mentioned, the LANL analysis that was done, that a -- the -- a time-weighted, one-person, one-sample, TWOPOS approach, is likely most appropriate for any potential comparison. And again, the comparison may not reflect the exposure

potential of what we're talking about, which is these RWP-driven, job-specific bioassay. And just given the known uncertainties in how these were collected and how much is missing, so you're comparing two populations, but if a portion of that population is missing or deemed a significant portion is missing, then, you know, that -- the utility of the numbers that we can reach doing this type of comparison is useful, but maybe not getting us all the way to the finish line or answering the mail, so to speak.

That's really all I have. I mean, it was a -- it was a small tasking, just to look at the feasibility, what data do we have, and what can we do with it. And that was SC&A's, again, tasking, and that's what we came up with. So, I'd love to entertain any questions.

CHAIR CLAWSON: Does any of the work group have any questions?

MEMBER LOCKEY: So, Bob, did you do the analysis?

MR. BARTON: No, we were actually only tasked with doing the feasibility, and one of our actual conclusions was that since NIOSH already has the modules in place to do the, essentially, the TWOPOS, the coworker, coexposure, excuse me, analysis, that was our recommendation, that if the work group wanted to proceed, that it would probably be best done in NIOSH's venue.

MEMBER LOCKEY: And the number -- Jim Lockey. The number of, was 0.25 percent had positive bioassays?

MR. BARTON: Yeah. That's what we found from the electronic database of in vitro urinalysis results.

MEMBER LOCKEY: (Indiscernible.) Okay, thank you.

CHAIR CLAWSON: Any other questions? Okay. We'll turn it over to NIOSH.

NIOSH/ORAUT PRESENTATION: ANALYSIS OF SUBCONTRACTOR CTW DATA AT SAVANNAH RIVER SITE 1991-2007

DR. CARDARELLI: Okay. Sharing my screen here. I'm assuming everyone can see that. And before I go forward, this is actually going to be, hopefully, a much easier presentation for all of us to discuss. And I want to acknowledge Dr. Nancy Chalmers who did the statistical analysis on this.

And in a big, long story short, it's really great that we basically did similar types of analysis using the exact same databases, and we came up with similar conclusions, but came about it in a different way.

So in the overview, I'm going to talk about what was actually discussed during the March 23rd, and what the tasking was, what was the purpose of it, the sources, obviously, we used, and that was discussed by Bob just recently. And it really comes down to, and here's the differences, was the critical definition of the subcontractor construction trade worker.

Our definition was slightly different, and I'll describe that, but ultimately, we came to the same conclusions, I believe.

And the data analysis that we did, and you will see them through the presentation, which is kind of a new -- new way of dealing with large volumes of results on a single page, where we introduce this concept of jitter

in the scatter plots. And I'll -- and I'll describe that as we go through, and ultimately get through our conclusions.

So, here is what really drove the discussion. This was, I believe, Dr. Lockey, during the -- and I'll read this into the record. So, Dr. Lockey stated, Let me -- suppose you look at bioassay data of these short-term workers where data does exist, and the -- and the point estimate and distribution is way out of hand of what the overall cohort is. That tells me something. If it falls right in the middle, that also tells me something.

The question is that Joe keeps raising, which I completely understand, that short-term workers could have been brought in to do the most hazardous jobs, the most abysmal, under the most abysmal working conditions, and they were never monitored. I can't be sure that the ones that were monitored reflect that worst-case situation, but at least I can look at the data, the bioassay data, and see where it falls. How representative is it of the cohort as a whole?

So, that was really what we took as to what Dr. Lockey was asking for to look at the raw data. So, the purpose that we understood it to be was to determine if subcontractor construction trade workers were among the most highly exposed workers at SRS between 1991 and 2007. Now, that was not the task in going to 2007. We just chose that because the databases provided us data through that time period, or actually that is when the SEC petition period ends.

So, we included all the data for that purpose. So, in March 2023 at

the SRS work group meeting, the SRS work group requested that the SC&A compare the bioassay data from subCTWs to bioassay data from all workers to determine whether or not the subconstruction trade workers' exposures tend to fall in the upper end of the results for all workers. NIOSH independently performed a similar assessment using the same data as was described in the previous presentation.

So, this is the data sources that NIOSH used. And we looked at individual personnel, some external legacy data, and external current data. You can see the time -- the years range from 1973 all the way up to 2023, but our analysis focused on 1991 through 2007. We looked at tritium as well, nontritium, and the current tritium and nontritium results from all the databases that we have.

One thing I want to point out is the number of rows. These aren't people. These are the number of samples that may have -- were included in the database, and they range anywhere between 165,000 samples to over two million. So, there's a huge amount of volume here for us to try to assess and kind of digest down to answer the question, if the subs are in here, subcontractor construction trade workers, are they more highly exposed than others?

And it comes down to how do you define what a subcontractor construction trade worker is? And it's very important because if an SEC is made, the Department of Labor has to be able to identify them. And how does one identify a subcontractor construction trade worker if it's very

difficult to do so? So, we went through and what we thought were subcontractor construction trade workers and identified them and -- which was different than that used by SC&A.

We did include baseline samples. We also included some results that were in mass or micrograms per liter for uranium. We converted those to dpm so that you can include them in there. I think SC&A excluded those. And SC&A ended their analysis in 1997, which was what they were asked for, which is no issue. But we extended ours through 2007 because the data simply is there for us to process that.

They recommended a TWOPOS and multiple imputation. And our response was that we really don't think that at this stage in the game, these are necessary to answer that question. Partly because if you look at the raw data, that represents the true data as it is. Once you start averaging and putting TWOPOS and multiple imputation together, you're going to converge and it'll make any differences less likely to appear because you're averaging. And plus, if we went down this road, we've effectively done a coexposure model. And right now, we're working with the work group here to determine if we should be able -- should do that.

So, NIOSH definition of a subcontractor construction trade worker was any record in the IND file where any of the following is true. Otherwise, the record was marked other, so we have a mutually exclusive comparison. And there were four basic factors that were used in identifying these. Number one was mostly any worker from Bechtel Savannah River Incorporated.

Number two, we had 19 other companies that were listed, so we incorporated them. And the TL -- we looked at 14 unique job titles as well, if that information would indicate a subcontractor construction trade worker. So, any -- and the last one was the -- whether or not there was information in the union craft database.

So, at the end of the day, I think what happened was we ended up expanding the number of subcontractors when we had to compare to what SC&A did. So, the SC&A definition was any record in the file where the company name is equal to sub. And if a worker is not designated as a sub, that worker was assumed to be employed by the prime contractor. So, even though we came at the same databases, you know, we've processed this -- and I think at the end of this presentation, you'll see that I think our conclusions should be about the same.

So, how did we go about doing this to present this amount of information? We generated scatter plots. We had to deal with that because we have censored results. Some results were less than zero, some results contained nothing, and we had a very large number near zero. So, how do we capture the raw aspect of all of this information? We felt the scatter plot was the best way to do it. We wanted them to be mutually exclusive. So, you're either a sub or you're not. A subcontractor, construction, trade worker, or you're not so there's no cross-mixing between the datas.

We did look at external dosimetry results, even though that was not (speaker's audio dropped) as well as tritium.

So, I'm getting a note that my internet connection is unstable. If there's any delay, let me know. Someone speak out. Otherwise, I'll keep going.

CHAIR CLAWSON: Yeah, I was just going to tell you, we lost you for a minute there, John. Okay.

DR. CARDARELLI: Is it okay, Joe, if I just -- I mean, Brad, if I move to the next slide?

CHAIR CLAWSON: Yeah. Yeah. It was -- I just -- we kind of lost you after the by subcontractor and other methods, but I didn't get anything on the external dosimetry results and so forth.

DR. CARDARELLI: Okay.

CHAIR CLAWSON: So, if you just wanted to clarify that.

DR. CARDARELLI: No, that's perfect. We chose to do the assessment using the external dosimetry results simply because we have the data and it adds to the overall picture, although it was not requested. So, this is kind of above and beyond type of assessment that we did. We did the same thing for tritium, which actually falls in the external dosimetry. So, we took a look at all of the data and processed it, I think, in a very objective, standardized way.

So, before I get into the results, I need to explain this scatterplot because it may look very unusual to most people. Typically, when you have a scatterplot, a raw number, and of course, on the X axis might be the year, 1991. If there are 500 results, but all equal to five for the year 1991, it

would appear as if it's a single dot. And that we know would be very misleading. Not-- we're trying to give you the picture of the massive -- that's where jitter is introduced, where it will put a dot anywhere along the line and randomly place it between the boundaries of the jitter. So, over on the right-hand side, we have this long line, but it represents 500 dots randomly placed between the spacing for 1991.

Now, if we take a look at this, and you have 5,000 results for 1991, but they're not all the same results, you would then begin to go up on the Y axis and match each dot to its value that is randomly placed between the jitter boundaries. So in this example, it would represent 5,000 data points that go up a range from wherever the data supports it. So, that would be taking it from 500 to 5,000 and now expanding it. Then we take that same set of data of 5,000 and we break them up to subcontractor construction trade workers and all other workers for the year 1991.

And in this particular slide, you will see them as red triangles here that would represent just subcontractor construction trade worker samples versus all others, which is a black circle in this particular image. And in this context, we would compare the two, the red with the black or the triangles versus the black dots to find out is there a situation that -- and this is the analysis I believe Dr. Lockey was looking for -- if subcontractor construction trade workers were more highly exposed than all others, you might see an image in the scatterplot that looks like the graph on the far left where the subconstruction trade workers tend to be higher exposed than the other

workers for any particular year. But if you don't see any difference, if you were to compare the two columns, it would be something similar to what you see in the middle. Between the two groups, it'd be very difficult to visually know whether or not subcontractors or others are exposed more or less to each other.

But on the far right is an example where if we looked at the data, subcontractor construction trade workers would tend to be lower exposed than others. So, that's a visual representation of what the results might be able to show us without us having to do the full TWOPOS and multiple imputation. And again, if we did do that, all of these numbers would be reduced, and they would be more similar because of the averaging aspect of that data. So, we want the raw data to be speaking to us in this -- in these particular analysis.

Now, this looks like a busy slide, but it represents almost 200,000 data points. And on the far left is the Y axis from 0 to 400 millirem on an annual deep dose basis. Now, because it's an annual deep dose, the numbers that you see above each of the columns represent a number of workers. And in this case, in 1991, there'd be 3,999 workers or results, because it's an annual dose, that's a worker, versus 19,222 other workers. And that's for the year 1991. If we were to go up to 1997, it's 1,391 subcontractor construction workers versus the 10,613.

So, that's how we would look at this across the spectrum. 200,000 results for us to look at this. And what we're really trying to depict here is

whether or not a black column or a red column is definitely deviating from each other. And, you know, at this point, you know, we'll probably come back to some of these, because I want to get through the presentation. So, I encourage any of the working group members to kind of take a look at this, also look at our report, and -- and draw up your questions so I can get through the next nine slides, which will look just like this. And I just wanted to present it without going through a deep dive on looking at a particular year or an issue. So, I'm going to get through the presentation, and we'll come back.

The one thing I will point out, we did this exact same analysis by using the SC&A definition for subcontractor construction trade workers, and those are not being shown here, but they are part of the overall report that we provided to you several months ago. So, all of the data is in the report. These are just examples of some of the key findings.

And then the next one is the tritium. It's in dose from zero to 50 millirem on an annual basis. Very, very small doses. But again, you'll get from 1991 about 1,990 subcontractor construction trade workers as compared to 7,373 others. And you can see the relationship as to are they equal? Does one have more than the other? Is that representative? Where does the data fall? If subcontractor construction trade workers are truly more highly exposed, you would expect the red columns, the red triangles, to be slightly higher or on the higher end when compared to others.

I'm going to move to the next slide. And by the way, this is the

annual tritium dose. It covers 43,342 workers between the years 1991 and 2007. Now, the scatter plot changes a little bit for the Plutonium-238 results.

This scatter jitter plot talks about -- or shows data for 106,364 samples, not workers. So, these are actual bioassay results from groups that are either identified as subcontractor construction trade workers or all other.

And so you can see it throughout time. And we can explain these if there are questions. They are all explained in the report. But you will see that there are negative results in certain time periods. And a lot of this is associated with how the procedures for counting have evolved over the years. So, everything that might appear to be unusual, I invite the working group members to note their questions, and we'll come back and we will give specific answers to you about a particular year or anything else.

We'll move on to Plutonium-239 results. Here it's 106,514 results between 1991 and 2007 for dpm per liter of Plutonium-239 in their urine samples. And again, you will see that there's negative results around -- starting 1993 and then it goes through time simply because these are raw results which impact how we would do our dose reconstructions. We have methods of handling what we would call the censored data through multiple imputation techniques.

So, americium results show 25,576, not nearly -- about one-fourth of what plutonium. And what you'll see in the early '90s here without going

into too much detail is why is there so much difference or less, and a lot of this happened to do with their procedures, and they didn't really do alpha spectrometry and unique americium identification until around '96. So, you know, that -- these are all -- all of these what might be perceived to be anomalies in this are fully explainable by the protocols that were in place at that time.

And we can certainly explain that. I expect those type of questions to be coming. But keep in mind the 12 up here for 1991 for subcontractor construction trade workers, that is not the number of people, that is the number of bioassay samples that that category of workforce left versus the 664 bioassay samples in that same year for all other workers. So, the way to really differentiate this is simply looking at the Y axis and if it says year --

CHAIR CLAWSON: John, we lost you.

DR. CARDARELLI: Hold on.

CHAIR CLAWSON: John, we -- we lost you there. You're back now. Yes.

DR. CARDARELLI: Hello?

CHAIR CLAWSON: Yes, you're back now.

DR. CARDARELLI: Can you hear me?

CHAIR CLAWSON: Yes.

DR. CARDARELLI: Hello?

CHAIR CLAWSON: Can you hear us? Sounds like a job for Tim.

DR. TAULBEE: John, can you hear us now?

DR. CARDARELLI: I can hear you, Tim. Can you hear me?

DR. TAULBEE: We can now, but we did lose you. So, --

MEMBER ZIEMER: We were just talking about the Y axis when we lost you.

DR. CARDARELLI: Okay. I apologize. I don't know what's going on with my internet here, but. The Y axis is basically a way to determine if it's a bioassay -- if it's a sample versus a number of workers. So, if it's a -- if it says year or millirem, that would be a worker. If it's dpm per L, it's a bioassay sample. So, if I'm lost again, if you lose me again, Brad, I heard you right away. So, let's move on.

We're almost through these examples. This is the same jitter plot for Curium-240 --

CHAIR CLAWSON: Losing you, John. John, we still can't hear you. Hello?

DR. CARDARELLI: Yeah. Can you hear me?

CHAIR CLAWSON: Okay. Yep. Just start over. Just start over where you did because as soon as you started talking, we lost you.

DR. CARDARELLI: Oh, well, Brad, please chime in like that. I -- I still don't know why that's happening. I have high -- high-speed internet at the house here, so it should not be a problem.

CHAIR CLAWSON: Yeah.

DR. CARDARELLI: Am I still there?

DR. TAULBEE: Yes, we can hear you, John.

MEMBER ZIEMER: Keep going.

DR. CARDARELLI: Sorry, guys. So, this just happens to be the same type of jitter plot for Curium-244 results representing about 24,000 bioassay samples, specifically 23,868 from the period of '91 through 2007. And really, they started this in earnest around '94. And it's not because they didn't monitor. It's just the way they would do the monitoring was gross alpha counting as to isotope-specific counting in the earlier years.

Again, you will see the same thing for Californium-252 results, 23,839 bioassay samples ranging basically between, like, a negative 0.2 to 0.05 dpm per liter. Again, the missing data, it's not really missing. We have the data, but it's in gross alpha. They just started doing isotope identification around '94 -- 1994.

The uranium results represent 51,747 bioassay samples. And again, you'll see a slight difference in the way they --

DR. TAULBEE: We lost you again, John. We still can't hear you.

DR. CARDARELLI: Am I there?

DR. TAULBEE: You are now.

MEMBER ZIEMER: Just got back.

DR. TAULBEE: Go ahead.

MEMBER ZIEMER: Just back.

DR. CARDARELLI: Yeah, sorry. I'm going to zip through this. I was going to explain that, but we'll come back with questions. But all of -- all of what you see here is explained actually in the report. There was no anomaly

that we found that was not explainable. But again, you would be looking at the difference between the red and the black and to find out if the red tends to be higher or lower or about the same for each year.

Neptunium-237 results are 13,147 bioassay results. And a similar type of pattern that you see from all the other scatter plots is observed in this. Strontium-90 results are the same way. And detailed discussions for explaining what's going on in the early '90s here is in the final report. It's all explainable. And I'm assuming that we'll cover that in the question section.

So in conclusion, the subcontractor construction trade workers' annual dosimetry results and bioassay samples do not tend to be higher than the other workers at SRS from 1991 through 2007. We did this for 10 separate radionuclides or external dose tritium, Plutonium-238, Plutonium-239, americium, curium, californium, uranium, neptunium, and strontium. We did not find any evidence in the data that subcontractor construction trade workers were among the most highly exposed at SRS. The same conclusion was drawn using the SC&A definition for subcontractor construction trade workers when we ran the analysis using their term for subCTWs.

And then finally, we don't believe it's necessary to conduct TWOPOS or the multiple amputation analysis because it would reduce the ability to look at differences between individual samples through the averaging aspect of these two methods. And if we did do that, we are basically developing a coexposure model already. And I --

CHAIR CLAWSON: Well, it sounds like we lost you right at the very

end there, John.

DR. CARDARELLI: So, am I back now?

CHAIR CLAWSON: Yeah, you're back now. So, you're just opening up for questions, and it shows that Paul's got a question.

MEMBER ZIEMER: I'll ask this to John, but it might maybe better go to Dr. Chalmers. Is the width of the -- in the jittery approach just an arbitrary width, doesn't have any statistical significance?

DR. CHALMERS: Correct.

DR. CARDARELLI: Correct.

DR. CHALMERS: It's just --

DR. CARDARELLI: Go ahead, Nancy.

DR. CHALMERS: Oh, sorry.

DR. CARDARELLI: Sorry. Nancy, I'm going to let you answer because of my -- my internet might go out, but I'll be listening to you.

DR. CHALMERS: Go ahead.

MEMBER ZIEMER: Let Dr. Chalmers answer.

DR. CARDARELLI: Sure.

DR. CHALMERS: The reason that I chose what I chose is just so you could still see a difference between the red -- the -- kind of the red column and the black column and get it all on one plot on one screen. There was no, you know, statistical basis, basically, to decide how much to jitter that.

I did it kind of as much as I could and so you can still kind of differentiate the colors and the symbols.

MEMBER ZIEMER: Thank you.

DR. CHALMERS: Sure.

MEMBER LOCKEY: Dr. Chalmers, Jim Lockey. Can you hear me?

DR. CHALMERS: Yeah.

MEMBER ZIEMER: We can hear you, Jim.

MEMBER LOCKEY: Good. Now, it -- it -- assume this was submitted for review for scientific publications. How would you define the limitations on your approach?

DR. CHALMERS: I think one thing that you're not -- like, we're not seeing here, it -- it's discussed in the actual white paper, is that if a result was censored, what you're seeing is a censoring level plot. Because it's, like, okay, how do I handle a censored result if I'm using a scatterplot? All I know is that it's less than, let's say, five millirem if we're talking annual or talking deep dose. So, all I know is the result is less than 5 millirem, so how do I represent that on a plot?

MEMBER LOCKEY: Right.

DR. CHALMERS: I don't know what the number is, right? It could be any number less than five. And so, you know, I don't necessarily think it matters here. This is -- this is one of the things with, you know, talking about TWOPOS, talking about multiple imputation, talking about all these things, could we do that; yes, of course we could. That's the complicated process that we go through for coexposure modeling. You know, I didn't -- I didn't feel the need to go through all of that because as long as I treat

things the same way for the subCTWs, which is the red group, as I treat the other workers, which is the black group, then I'm doing the same thing for both sets of workers. So, I haven't created anything that would make a difference or make less of a difference by the way I sort of chose to handle the data.

And so, you know, there's things like censored results you see, you know, they're not a different plotting symbol because it's like you already have two plotting symbols with two different colors. If you try to throw in another plotting symbol to represent censored data, things are going to get really busy. And so, you know, and there could be criticism of this. Well, you know, you could do a test to test to see whether one group's the same as the other, but it's like, okay, but if we go back to the slide where John discussed, you know, some of the difficulties and why I chose the plot I chose, we have all sorts of censored data. We have negative data. The results are reported, you know, as a number less than zero. You got a large number of results near zero.

SC&A was suggesting, hey, you could kind of do what report one and two does, which is the LANL report. You know, that made an assumption of a log normal distribution because they created a log normal QQ plot. I wanted something that was -- you know, that we assume no distribution. And so, you know, there's all kinds of plots. We explored like seven different kinds of plots, and this is sort of what we settled on. So, does that answer your question, Dr. Lockey?

MEMBER LOCKEY: It does answer my question. It was a very elegant analysis and well presented. Thank you.

DR. CHALMERS: Thank you. I dreamed up these plots. You may never see another plot like this again. It was --

MEMBER LOCKEY: It's a great visual presentation. It really is, because it's a very complex analysis. And to visually present it in a way that's understandable, takes some -- took some ingenuity. I appreciate that.

DR. CHALMERS: Thanks. I appreciate that.

CHAIR CLAWSON: I have a question, Nancy. On this one right here where we're -- where we're looking at this, I can't see the years or anything, but the first two to three columns looks like both '91 through '92. So, each one of them has kind of lines, but I never see that throughout.

DR. CHALMERS: Yes, sir.

CHAIR CLAWSON: Why? Yeah.

DR. CHALMERS: Yeah, yeah. The external doses in that time period were reported to the nearest five millirem.

CHAIR CLAWSON: Okay.

DR. CHALMERS: So, they only reported 5, 10, 15, 20, whereas when you get to '93 forward, they're reporting, like, one, two, three, four, five, six millirem, so, as -- as integers instead of like a number around it to the nearest 5. So, that's what you're seeing. It would create --

CHAIR CLAWSON: Oh, okay. I --

DR. CHALMERS: -- these kind of -- these kind of lines or whatever you want to call them and what you're seeing, because that's the jitter. It's basically every five you're seeing that jitter that John showed you. And so, it kind of looks like lines there, but yeah, that's a good -- that's a good observation.

CHAIR CLAWSON: So, the reason you call it jitter is because it's kind of like having too much coffee, and it's kind of jittery across there? Is that --

DR. CHALMERS: Yeah, it --

CHAIR CLAWSON: -- it -- it looks very good. I do have a question though of the -- of the subcontractors. You said that you were separating them out using union, union rosters, so forth. Part of our issue that we went through from the very beginning, I was wondering how we got around this, is because they all were a part of the same unions, but one could be a prime contractor and one could be a subcontractor, but they still showed up on the same rosters. And it was not uncommon for them to jump from being a prime to a subcontractor. And I'm just wondering how -- how did we address that in this? Because this has been an issue for quite a while with us.

DR. CHALMERS: I'm --

CHAIR CLAWSON: And maybe John --

DR. CHALMERS: Yeah. I'm going to have to pass that question off because this is the only part of this analysis that I didn't do.

CHAIR CLAWSON: Oh, now, come on.

DR. CHALMERS: I'm a statistician at heart. And so, the definition was the part that I was like, guys, give me a definition. And so, that's what they gave me. So, I think Tim and John can kind of handle that.

CHAIR CLAWSON: I -- I understand that. Okay.

DR. CARDARELLI: Tim, do you want to go it, or you want me to start it?

DR. TAULBEE: I'll -- I'll try here from that standpoint. Brad, I mean, you're right. There are times when workers would move back and forth between one and the other along this lines. Part of our broad definition here was we started with anybody who was Bechtel to start with, because that's who, when you -- when you go out and you interview -- and you've done this. You've talked to the construction trades workers out there at the site, and you talk to them -- when they all went under the Bechtel umbrella, which was back when Westinghouse took over, that was kind of considered construction trades at that time.

You no longer had the DuPont era where people working for DuPont were considered, I think it was local wage is how it was considered in our role too.

So, that was our first cut as to the subCTWs, Bechtel being the largest subcontractor for CTWs. And then we went and looked at other companies, the 19 listed companies, and somebody from ORAU can correct me on this, but we came up with these a lot based upon our RWPs that we did, that we

looked at from our -- or from the Report 92, who we saw with these other companies showing up on the RWPs. And then we looked at job titles, you know, as another cut, you know. Obviously, if somebody doesn't have one of these companies, but they're not Westinghouse, they're not Bechtel, but their job title is pipefitter, we included them. We're assuming they're a sub from somewhere else along those lines. So, that's how we kind of built this definition of subcontractor CTWs.

Now, you know, as John pointed out, we took SC&A's definition as well and redid the analysis. So, and that's attached to our report, and you can go through and you can look at all the jitter plots using SC&A's definition of just the company name equal to sub. And so, that was how it was developed. Does that help, sir?

CHAIR CLAWSON: Yeah, it does. It's just -- you know, as well as I do, we've been battling over this, the subcontractor versus the prime. Yes, there was a difference when it went from DuPont to Bechtel, but even today, we still have a little bit of a difference in that. But I guess I was kind of looking at it -- and just because of the position I'm in, I was looking at when you start calling them names, I'm just looking at the difference throughout the years where you have plumber, pipefitter, different terminations, and I'm looking at what -- how would this affect your coexposure models with these different names and terminations, because some of them are totally different.

But that -- that -- that's for another question. This -- this jitter plot is

-- is what -- what we're there on. I'm just looking at the broader picture, I guess, a little bit in that. And this, as I've always said, Savannah River is a unique site from the standpoint of how they used union workers plus company workers. So, I was just trying to figure out the footings for what these jitter plots were doing.

Any other questions?

MEMBER LOCKEY: Hey, Brad, Jim Lockey. So, if we go back and look at this, there's no difference in the data, what I'm -- what I'm seeing here when I look at the report.

It doesn't change. Do you think you could merge this data into one database? Would you feel comfortable? I'm not asking you to do that, but if -- if -- if you were looking at this data now, would you separate the subcontractors from the contractors?

DR. TAULBEE: I was going to let John and Nancy answer that before I did.

DR. CHALMERS: Well, from my perspective -- well, I'll -- I'll give you my statistical perspective, and you guys can chime in on, like, maybe how we would handle this moving forward for coexposures. But I come to the same conclusion you do, Dr. Lockey.

I don't think these two groups look very different. If anything, maybe the subs are a little lower than the other workers. So statistically, I see no reason to separate them, because creating separate models, you know, you get into smaller sample sizes, which affects uncertainty and those sorts of

things. So, I don't see any reason based on what I'm seeing here not to combine them and use all of their data together. Now there's another question about when we go to make these coexposure models, whether we should stratify and all of that, but a lot of times that -- that discussion is higher level than just me statistically saying what I see in this plot. So, that's what I'm going to let Tim and John kind of pipe in on here.

MEMBER LOCKEY: Dr. Lockey. You know, from a statistical perspective, I would agree with what you said. Splitting them out, you get into power calculation issues and putting them together is such a more vigorous way to create a more valid and scientifically valid database. So, just based looking at the data, not taking consider -- consideration of policy issues from a scientific perspective, I totally agree with you.

CHAIR CLAWSON: This is Brad. But I understand what you're saying that going to smaller cases, but by taking all of these like this, are we not diluting this?

MEMBER LOCKEY: Not really. You're increasing the power of your database. You're increasing the -- the power to determine a real value, because there's no difference in these data. If there was difference in the data, then you should split them apart, but there's no difference here. So, you decrease your power by -- by splitting them apart.

CHAIR CLAWSON: Well, so, let's go to plutonium. Let's -- I -- because I'm trying to understand this a little bit my -- myself, and this is not my area of expertise. So, let's look at '92 to '94 right there. See, it looks

like there, the subcontractors are a little bit higher on both sides, you know. And this is -- this is the earlier years, and I think -- I think in '92 we can actually see a change in the way that they were monitoring this. And then we -- we get out here into '96, '97, you know, there -- there's not that much difference. The -- the year, it -- it kind of looks like -- I don't know if this is per people or whatever else, but you're right, around '97 or so, it -- it looks like a continuous decline to me.

DR. CARDARELLI: Brad, these are samples, bioassay samples, not -- not number of people in this context.

CHAIR CLAWSON: Right, right.

DR. TAULBEE: This is Tim. John, could you go back up to the plot where you're showing the higher, the lower, the -- the three examples? That one, right there. And this is something -- this is kind of a -- well, it's a judgment call there, Brad. But when you look at on the left, it's clearly higher. And then on the far right, the subcontractor CTWs are clearly lower. And in the middle, you're going to have this variation, this -- this, where there's no kind of observable difference. And that's what I think you're seeing there in that 1992, '93, '94.

Now, if you go -- John, if you'll flip to plutonium again. With those -- those three. And so, that's what you're kind of seeing here. And then when the data gets crunched down, obviously, it's even harder to make those differences or determinations. But in this particular case, there's no real difference between those two groups, even in 1992. And, you know, if the

subcontractor CTWs or even the -- I'm sorry, the other workers were significantly higher, it would be more observable than what you're seeing here. That's why we're making that determination of them effectively being the same. And making that -- you know, I wholeheartedly agree with Dr. Lockheed and then Dr. Chalmers, that there's really no reason to break these two apart. Now, you know, if the work group said, no, we really feel these need to be broken apart, then, obviously, we've got the capability to do so. And we can do two different coexposure models. But I agree, statistically, there's no reason here for us to be doing that with this group, with this set of data.

DR. CARDARELLI: I would only add that all of these data charts seem to suggest, too, that the subcontractor construction trade workers really don't fall into the highest exposed group, which was one of the reasons we started looking at this or were working in the dirtiest jobs, when we take a look at all of the results the way we have.

So, that's just another point I thought I'd bring out.

CHAIR CLAWSON: Okay. Any other -- any other questions on this?

MEMBER LOCKEY: This is from Dr. Lockey's perspective. Thanks for putting the analysis together. It's -- it's something we do also in our databases, and it really helps to look at the data. It really does.

CHAIR CLAWSON: Okay. Well, with that being said, I guess we've got some work group discussions to be able to go on, be able to discuss what our path forward is.

Paul, have you got any -- any suggestions?

MEMBER ZIEMER: Well, it seems to me right now that the -- the issue boils down to whether or not we can do the bounding, starting in '90 versus some later year, which is undefined at the moment. The -- the data that we're -- that we've just seen suggests that the two -- the possibility of having a group that wouldn't be bound is, in my mind, pretty much removed. The only other issue is whether or not we're comfortable with a '90 -- would be a '91 starting year versus, you know, a '92 or '93 or whatever it might be. And I'm -- I'm trying to get a feel for how we can sort of resolve that to our satisfaction.

CHAIR CLAWSON: Well, Paul, let -- let me -- let me throw something out here to you, because I realize where this is all at, but I want you to remember when the notice of violation was. That's -- that's in '97. And we were still having these issues and these problems at that time. And I still think that it shows that there was some issues throughout there. I personally wanted to be able to put out to the work group that we look at extending the SEC from '90 to December 31st of '96. Because the next year -- and the reason why I felt this way, is because in '97 is when they had the 100 percent done that I feel comfortable that everything was -- was covered. Because with the notice of violation, they had to go out and had to get all these people who had not submitted a bioassay to submit one. And it was, to me, my personal opinion, is when it was 100 percent.

And when -- I feel comfortable with that. And so, what I wanted to

throw out the other work group members was what their feeling is on that and push forward.

MEMBER ZIEMER: Well, certainly that's an important data point. But I would ask the question, and realizing that there is a violation there, but the question in my mind is whether or not that impacts on the data available earlier that would still allow the -- the decision to be made on establishing the coworker model earlier. I think --

CHAIR CLAWSON: Yeah. I -- Paul, I -- Paul, I kind of looked at this, not just -- not just the notice of violation, but the -- the self-identifying the weaknesses from Savannah River before that notice of violation. And this was self-identifying. If you remember, right in that time period, DOE kind of gave them a carte blanche coverage of, you guys need to take a look at your -- your programs and how they're being implemented and how they're being put into this and self-identify, and we're not going to slap you on the wrist with it. But then after that, there was the notice of violation. So, this is Savannah River actually themselves saying where their weaknesses were and what the problems were in the system. So that's --

MEMBER ZIEMER: Well, I'm -- I'm -- I'm -- I quite understand that, Brad. And you realize that in 1990, when the Tiger teams identified the major issue, that -- that was when I was there.

CHAIR CLAWSON: Yes.

MEMBER ZIEMER: -- DOE.

CHAIR CLAWSON: Yes, I do.

MEMBER ZIEMER: I'm very familiar with --

CHAIR CLAWSON: Well, I -- I wasn't going to say that, Paul, but yes.

MEMBER ZIEMER: But -- well, that was -- that our job. That's what -- and some others in this call were around at the same time. But I'm trying to -- and somewhere between that and the '96, was it, year --

CHAIR CLAWSON: Yeah, the end of '96, --

MEMBER ZIEMER: Yeah.

CHAIR CLAWSON: -- because in '97, that's -- that's when they did the 100 percent --

MEMBER ZIEMER: Right.

CHAIR CLAWSON: -- that they did.

MEMBER ZIEMER: But you see, we all have this feeling like if they couldn't do it on December 31st, could they suddenly do it on January 1st versus when they got to the 100 percent, could they not do it the day before or the day before that? Somewhere between those two extremes certainly there was a capability of doing the coworker model. But we might want to hear some further arguments from both sides on -- both NIOSH and SC&A, maybe -- maybe our other work group members, all of whom are not allowed to speak.

CHAIR CLAWSON: Paul, -- Paul, you know the rules on that. But yeah, that's very true. My --

MEMBER ZIEMER: No, I don't know the rules on that.

CHAIR CLAWSON: Neither do I. So, I have been -- I have been

chastised, though, for bringing some of that up a little bit.

MEMBER ZIEMER: No, I think --

CHAIR CLAWSON: But anyway, --

MEMBER ZIEMER: -- No, I'm not going to back down on that fact.

CHAIR CLAWSON: I know you're not.

MEMBER ZIEMER: I'm thinking in future work meetings, I may not speak myself --

CHAIR CLAWSON: Well -- well, I understand that.

MEMBER ZIEMER: -- and urge others not to speak as well.

CHAIR CLAWSON: Right. Well, let's -- let's -- NIOSH, why don't you, John or Tim, give us your -- you know, let us -- let -- let's just -- let's just for one -- one question here that always comes down to is data completeness versus representing -- representation -- representing -- is the -- is the data complete?

DR. TAULBEE: Well, this is Tim. First of all, it is not. That is part of why we develop a coexposure model. If we had all of the data, we would not need a coexposure model. That's -- that's just kind of simple fact there. But one of the things is, you know, is it complete enough? And we've demonstrated here that through the TRACK database analysis, that the highest exposed workers are part of this data that we do have, that we would use to develop a coexposure model. And we've demonstrated through Report 92 that the workers who were not monitored were working alongside workers who were monitored. And so, so that meets the definitions from the

coexposure model of representativeness.

And from the completeness standpoint, we've demonstrated that we have the highest exposed workers. This is what forms our basis that we believe, starting in January 1st, 1991, that the coexposure model can be used for these unmonitored workers to estimate and bound their dose.

CHAIR CLAWSON: Okay. SC&A, I guess I'd -- I'd turn to you. And Joe or Bob, what's your feelings on this? Because I know that we've been -- I know that this is a data completeness and representation. It's a -- there's a couple of things there. Go ahead.

MR. FITZGERALD: Yeah, I, I think -- I think Dr. Ziemer was kind of poking at the issue is -- is from the perspective that I kind of look at it. It -- it does come down to -- and we -- we -- we in our conclusion five struggled to describe it, maybe not as good as we wanted to, but it's -- it's -- it's a balancing of the data completeness, with the representativeness, which is the basis for the coexposure model.

And, it's on day one, you know, let's use that analogy, January 1, 1991, without a, you know, an implemented RWB program, without job-specific bioassays being mandated, and pretty much, you know, carrying over the, what was the DuPont program, in essence, because the radiological improvement program hadn't taken a foot yet. Westinghouse hadn't had the chance. I would -- I would argue that you know, the data isn't adequately complete in that early period. It was getting better, but certainly from a sufficiency standpoint -- I know that's a difficult proposition

in this -- in this thing -- but from a sufficiency standpoint, I would argue that the -- the available bioassay data wasn't sufficient to be representative. What -- you know, you don't know what's missing, but certainly what -- what's missing could, in terms of the bounding analysis, could definitely impact that.

On the -- on the other side I -- I kind of agree that the end of '96 would be perhaps extreme in the other regard that you had a lot more bioassay data. You had a much more mature program in terms of job-specific bioassays and the implementation that was taking place across the site. You still had the issue of, you know, failure to collect, but you also had the mitigating circumstances that I mentioned earlier. So, I do think you're balancing data completeness and the question of representativeness, which is required for a coexposure model.

And I think the, the -- the work group is in that, I guess, difficult position of trying to balance those two considerations in terms of deciding when a coexposure model would be sufficiently founded on the available and representative job-specific bioassay data. And I -- I do think that would fall probably -- and I said this earlier -- probably in that 1992 through '94 time frame, sort of the -- the middle time periods when the program was getting mature enough and there was more job-specific bioassays and the representativeness of those job-specific bioassays at that stage would be -- I -- I think you could judge it to be more mature and more adequate, but is there any objective proof? I don't think there is per se. I think the jitter

diagram is helpful. I think that -- that does argue that you could, in fact, populate a coexposure model at some point in that time frame. I just don't think it would be on day one of 1991.

CHAIR CLAWSON: Thank you. I -- I appreciate that. And I agree with that too. Here -- here's one of the things that puts us into a -- an interesting position. And Lockey and -- and Paul and Dave, this -- we are not going to be able to solve all of the issues because ultimately it comes down to what the Board as a whole votes. But I do feel that we need to be able to present something to the Board that -- that is -- that -- that we can shoot for. So I -- I've put out there, my personal opinion is that -- I still want to go to the -- the -- the time, the end of '96, but -- but what Joe has also said, too, comes out to it. I'd like to -- I'd like Lockey and Paul, if -- because I would like to be able to propose something to the Board, because I'd like to get this out of work group. We've been at this way too long and bring a -- bring a close to this one on this.

And so I'd like to have you guys put your input on it. David, I know that you're there. You can't comment, but I just wanted to put something out there towards the Board.

So, I'm looking for your input. And I'm -- I'm saying that it's December 31st of '96. What -- what's your feelings?

MEMBER LOCKEY: Hey, Brad, Jim Lockey.

CHAIR CLAWSON: Yeah.

(Whereupon, device feedback from Chair Clawson is heard

periodically.)

MEMBER LOCKEY: I think, you know, I'm looking -- if I look at this from a scientific perspective, I think NIOSH is more than adequately presented today to do dose reconstruction in a very scientifically sound manner. Looking at it from a public policy perspective and taking into consideration what Paul and Joe have said and what you have voiced, you know, I'm willing -- I'm willing to say that scientifically they can do it, but, you know, I think starting 1992 is a reasonable place to say '92 on, they can do dose reconstruction. Prior to that, we're going to have a transition period from the old period to new period. You know, I'm comfortable with it. I'm not comfortable with '96. This database is very complete and very rigorous. And from a scientific perspective, it's very valid.

CHAIR CLAWSON: Okay. Very well put. Do you -- do you want to put a -- put a date to that so that we have -- so, you're saying that the end of '91, that you feel it can be done? So January 1 of 1992?

MEMBER LOCKEY: Well, if you ask me why I picked that, I'm just looking at a transition period. I'm sort of taking it under advisement. What Paul and Joe said, there's this transition period from the old contractor to new contractor to get things implemented. And I'm saying that in view that my professional opinion is they can do dose reconstruction. So, what I'm willing to say from a public policy perspective, just give us some leeway and allow for that transition period. I think that's a reasonable compromise.

CHAIR CLAWSON: Yeah, I -- I do too. I -- I guess I question on the

date. And I guess what I'd probably go is ninety -- December 31, 1992. That's when -- that's when it's given them time to be able to get in there, be able to actually figure out what they've really got, and go from there. I would -- I guess I -- I would throw that out in, in -- in your comments that you've just made.

MEMBER ZIEMER: So Brad, let me react to that further. And I -- I was bringing up the -- the two extremes, mainly just to get a feel for where people were. I -- I agree with Tim Taulbee that we scientifically can -- can do a coworker model. Probably could have done it January 1st of '91, but somehow you have to make a cutoff. I'm personally okay with the idea, taking into consideration public policy, of talking about the idea that there still would be some uncertainty as to when the -- when magic day happens. I think Brad, you're suggesting January 1st of '92.

CHAIR CLAWSON: Well, I'd say -- I'd say the cutoff -- I said 1992, December 31, 1992, that way in January 1993, that they can do it.

MEMBER ZIEMER: So, --

CHAIR CLAWSON: That's kind of --

MEMBER ZIEMER: -- you're suggesting two more years of -- of --

CHAIR CLAWSON: Right.

MEMBER ZIEMER: Yeah.

CHAIR CLAWSON: Right. And the reason why I'm saying that is just because just like what Lockey brought up and -- and any of us that have dealt with new contractors coming in, especially going from the DuPont era

into this and so forth, maybe it's just a common ground in there. That's, I guess -- I guess what I would throw out and you, you guys can -- I would say December '92, December 31, 1992 is the cutoff of the SEC. That'd be -- that'd be two more years to it and go from there. I -- I -- you know, I was looking at all the notice of violation and everything else. We still got into trouble down the line, but looking at the policy, looking at the science of it, everything else like that and the data that has been put forth to us, I would compromise, I guess, and go for that. What's your guys' feelings?

MEMBER ZIEMER: Well, I think, I think you've heard from both of us and maybe -- maybe you present that to the Board. I -- I'm -- I'm reluctant to do a Board vote because I don't want to vote in -- in preference to our colleague who can't vote. But you can, you can relay to -- I'm, this is my opinion. I don't -- Jim, you can -- may not agree with this, but Brad, you can kind of summarize where we ended up on this.

CHAIR CLAWSON: Okay. I -- Paul, I -- I understand wholeheartedly. I guess I've never taken anything to the Board that we -- the work group hasn't voted on, but I understand fully.

MEMBER ZIEMER: Well, you -- you -- you and Jim can vote if you want.

CHAIR CLAWSON: Yeah. Thanks.

MEMBER ZIEMER: I will abstain. I will abstain from voting. I will not vote if our colleague's not allowed to vote.

CHAIR CLAWSON: I, I understand. I understand.

MEMBER LOCKEY: Okay. Brad?

CHAIR CLAWSON: Yep.

MEMBER LOCKEY: I'm okay with December '92. If you and I voted, we can present it to the Board. I think -- I think it's -- it's merging scientific data and public policy and it -- it's what our Board is supposed to do.

CHAIR CLAWSON: Right.

MEMBER LOCKEY: So, I think it's a -- it's a very reasonable approach to take to a very complex problem.

CHAIR CLAWSON: Okay. So I -- I will tell you the truth. We -- we have not voted. I don't want to vote for the same reason Paul doesn't want to vote, but how about if I bring this before the Board as a work group --

MEMBER LOCKEY: Position. Position.

CHAIR CLAWSON: -- position, would you two feel good about that?

MEMBER LOCKEY: I would.

CHAIR CLAWSON: Okay. Then that's, that's what we'll do. Thank you, Paul, for being as steadfast as you are on it. I feel the same way as you do and -- and the issues. So, at the next board meeting, I'll -- I'll present this to the Board and let them be able to discuss that and go forth. But we would decide on December 31, 1992, would be the cutoff on the SEC.

MEMBER ZIEMER: This would be at which board meeting?

CHAIR CLAWSON: Well, I can throw it out. The -- the next one's coming up in October or

MEMBER ZIEMER: Is that a -- is that a planning meeting or --

DR. ROBERTS: Yeah, that's -- that's a teleconference.

CHAIR CLAWSON: Teleconference.

DR. ROBERTS: And mainly administrative.

MEMBER LOCKEY: Rashaun, when are we going to meet in person again?

DR. ROBERTS: Yeah, that -- that is a really good question. I'm hopeful that we would be able to do our April meeting face-to-face.

MEMBER LOCKEY: I mean, I -- I don't know why we can't. Is there some administrative issue about not meeting in person? I'd love to see Brad again. If no other reason (indiscernible) --

DR. ROBERTS: Yeah.

CHAIR CLAWSON: I -- I -- I -- I -- I have -- I don't want to do this on a teleconference. I would rather do this in a full Board meeting in person --

MEMBER LOCKEY: (Indiscernible) --

CHAIR CLAWSON: -- if that's all right with you, if that's --

MEMBER LOCKEY: I agree.

CHAIR CLAWSON: Okay. If that's all right with you two, I'll -- I'll wait till we're -- we're able to do that. And we'll put that on the agenda with Rashaun.

I -- I do want to take care of some issues tasking for SC&A at this time, because there was some changes to the Savannah River TBD dealing with nonSEC dose reconstructions. And I don't believe, Bob, that -- that

SC&A has looked at this, and I'd like to have -- task SC&A to be able to review this and give us a report on that.

MR. BARTON: That's correct. And what --

MEMBER ZIEMER: What -- what was that, Brad, exactly? What was the issue there?

CHAIR CLAWSON: NIOSH -- NIOSH changed -- made changes to the TBD. And from my reading of it, I -- I'm having a little bit hard understanding what -- what went on there. They changed it for non nonSEC dose reconstructions. This also came up because I was notified by a designated person, and you guys should have gotten an email from this individual of issues with that. So, I wanted to be able to better understand what the changes that they have done to the TBD. And so, I wanted to task SC&A to be able to review this and give us a report on this so that I better understand what the changing -- changes were in it.

Usually -- usually if -- Paul, when -- when we do a TBD change like this, usually we've done it in unison. So, I don't know if it's because we haven't been able to meet or whatever. We were notified of changes and so forth, and they're lined out in there, but I'd just like SC&A to be able to review this and give us a report back on it. All right? I think I've been waiting about six months to do this tasking, too. Well, so that's what it was about, Paul.

MEMBER ZIEMER: Okay. Thank you.

CHAIR CLAWSON: Is -- so, Bob, I guess, back -- let's see, LaVon,

you've raised your hand. You're quiet.

MR. RUTHERFORD: Can you hear me, Brad?

CHAIR CLAWSON: I can hear you. You can put your hand down now, though.

MR. RUTHERFORD: Okay. I just want to -- wanted to kind of give the -- you know, I understand the tasking and such, but I just wanted to give the work group an idea of the -- what the changes -- what was driving the change. If you -- you know, when the SEC, the last SEC class was identified, you know, our standard procedure is after that class is identified, there's certain things that we can't reconstruct any longer. You know, we've -- we've already defined there's some infeasibility that -- that's driven that class. So, what we have to do for the nonpresumptives, for the people that don't meet that class criteria, we've got to make those changes to the TBD to reflect those things that we can no longer do. And so, that was a big driver.

And then another driver to that was, if you remember that the old SRS TBD has had a -- had a sig -- was a -- one big TBD and -- and we had changed our formats and such for TBDs and moved it to a, you know, seven sections and -- and so that was a driver. We had a lot of things on our plate. The problem we got into with that, and I just want to let the work group know, is that in incorporating that SEC, we tried to -- to fix some of the other issues with the TBD at the time, which caused that -- the time required to get that revision done to -- to be longer than we would have

liked. And so, we had claims pending because we could not do claims. We couldn't put dose into claims that we've already said we can't do any longer or the Board and the secretary have said we can no longer do. So, we had those claims pending. You know, in retrospect, we should have just made that portion of the revision and then gone on and made a larger revision later, but we were close. We felt that we were close in that process and thought we could get it done in a reasonable period of time. It took a lot longer. I -- so I just wanted to take that moment to explain a little bit about that.

CHAIR CLAWSON: And LaVon, I -- I appreciate that. I've -- I've -- I -- I've been kind of stuck in the middle on a lot of this. And usually, you know, as well as I do that, whenever we do changes -- and we have a whole matrix of once we get these SEC issues taken care of, that is going to change the TBD. We -- we've got numerous changes that we have held off on until we do a complete TBD change. And I understand what you're doing, and I'm just wanting to -- to task SC&A to -- so that we keep up on what changes have happened and document the reviews of it. I do appreciate you giving me the rundown of this. I -- I -- I really do appreciate that because it has helped. And I like having the people that are listening to this to be able to understand that, too. So, thank you so much.

MR. RUTHERFORD: No problem.

CHAIR CLAWSON: So -- so, Bob, do we have any -- do you have any questions in the tasking?

MR. BARTON: Well, I guess, is it official, first of all? And not to belabor the conversation, so if it was more than just adding the SEC language, and that's certainly something we want to trace back to the original matrix discussions, and then figure out what's still hanging out there, but again, that's probably not for today. So, maybe a technical call in the future would be warranted.

CHAIR CLAWSON: Well, that sounds like Tim's -- Tim's raising his hand there.

DR. TAULBEE: What I was going to -- I was just going to briefly try and answer Bob's question, but if he wants to do a technical call, that -- that's fine, too. It's a great -- a large number of changes have occurred. So, kind of a complete review of those seems appropriate to me from that standpoint, from SC&A looking at it. It -- the number of changes is really voluminous from that standpoint. So, you know, I -- I fully would recommend SC&A look at the whole thing.

CHAIR CLAWSON: Yeah. Well, and -- and, you know, Tim, as well as we do through the years -- and this is kind of what -- I know that you were involved in the frustration that -- that I expressed and stuff like that, is usually when we go into a TBD update like this, it is kind of in unison. And this one kind of -- I understand why you did it. I understand what we got into. And then I kind of morphed into a little bit more, I believe. But we just need to stay on top of that and continue on with it. So, this is why I just wanted to get an understanding of what -- everything that got in there,

because there was a lot more change than I could really see and go from there. So, I just wanted to stay on top of that.

So, Bob, does that answer your question more fully?

MR. BARTON: Yeah, I believe so. I mean, we've done this kind of process before. I just want to make sure that the SC&A is officially tasked with moving forward on this.

CHAIR CLAWSON: Okay. That -- that sounds good.

So, are there -- just for the other Board members on this work group. So, we will not present at this October, but we will present it at the next full Board meeting in person. It's -- this next one's more of an administrative ones or so forth. And I think that we need to allow enough time to be able to have a discussion with the full Board members so they understand what we're doing a little bit better instead of doing it on just on the phone. Is there any issues --

DR. ROBERTS: Brad?

CHAIR CLAWSON: -- with that, Paul or -- or Lockey?

MEMBER LOCKEY: No, Brad.

DR. ROBERTS: Brad?

MEMBER ZIEMER: That's fine.

MEMBER LOCKEY: Brad, when we make the presentation to the Board, are you going to -- are we going to do it as a -- as a committee? Everybody gets to see what's going to be presented?

CHAIR CLAWSON: Yes.

MEMBER LOCKEY: Okay.

CHAIR CLAWSON: Yes.

DR. ROBERTS: Brad, I just wanted to remind you that there is a, a December Board meeting on the -- on the books, but that is virtual.

MEMBER LOCKEY: Any way we can change that to in-person, Rashaun?

DR. ROBERTS: I think -- well, how about, we can discuss that in the October teleconference? There -- there's some things that, you know, the Board will be informed of at that point.

CHAIR CLAWSON: Okay.

MEMBER LOCKEY: Let me ask Rashaun one more question. Will there be enough time if we choose to do it in person in the October conference call to -- to have it arranged by December?

DR. ROBERTS: No, no, no.

MEMBER LOCKEY: Then that --

DR. ROBERTS: In fact, you know, we're now already probably past that point to be able to do something in person. You know, we have to deal with the contract system and everything.

CHAIR CLAWSON: Well Lockey, we could look at the December one. It's -- it's going to be virtual, but I would feel better about being able to give a presentation to the full Board as -- even though it's not in person, but be able to give the presentation and have the discussion and go from there, because this October one is more just a -- a technical one to be able to go

over things. Would you guys feel all right with that in December?

MEMBER ZIEMER: Yeah. yeah.

MEMBER LOCKEY: Well, I --

CHAIR CLAWSON: And by that time, we should have some of these other issues taken care of, Paul.

MEMBER ZIEMER: Yes.

CHAIR CLAWSON: Okay.

MEMBER ZIEMER: Hopefully.

CHAIR CLAWSON: That -- that is true.

So, I guess -- I guess I want to throw out now if there are any other questions from any other members of -- of SC&A or NIOSH or -- or any of the Board members, if they have anything to -- that they need to have answered so we can give clarity.

MR. BARTON: Well, this is Bob. I think you mentioned SC&A and NIOSH. You know, it's not uncommon to sort of present something to the Board, but maybe not for a vote so that they can get, you know, an initial impression of where things stand and then, you know, provide all the pertinent files in December. Because that, that is a full Board meeting, but it's virtual. And then if you wanted to do the vote in person, then we'd be looking at April.

CHAIR CLAWSON: Right. Okay.

MEMBER LOCKEY: My -- my only comment, Brad is -- is -- is John, can you, can you put the TRACK data in and out? I don't think it's going to

be a difference in your outcomes, but I'd like to know. Would you?

DR. CARDARELLI: I didn't hear you on -- you broke up. Can I put what out? I'm sorry.

MEMBER LOCKEY: Track data, put it in your database and then pull it out to see if there's any differences in relationship to dose reconstruction.

DR. CARDARELLI: We're talking about the 1,800 rows for the TRACK database; is that --

MEMBER LOCKEY: Yes. You -- you've got -- we discussed that earlier.

DR. CARDARELLI: Right.

MEMBER LOCKEY: Yeah.

DR. CARDARELLI: Okay. On that TRACK database, I think we can. I will get back to you on that, but I'll work with Nancy and make sure that the programming is in place.

MEMBER LOCKEY: I don't think it, I don't think there'll be a difference, but if there was, then that -- that's -- I

DR. CARDARELLI: Sure. Sure.

DR. CHALMERS: Hey, Dr. Lockey, can I ask you a -- just a clarifying question, maybe?

MEMBER LOCKEY: Yeah.

DR. CHALMERS: Did you envision something like the subCTW jittered scatterplots? Like, if we did that with bioassay results that were as a result of TRACK versus the ones that aren't; is that kind of...?

MEMBER LOCKEY: I think that would be adequate or -- or just -- just

a quick look at the data to see if you see anything that indicates that with the -- with the data removed, there is -- appears to be a real difference in your outcomes. That's -- that's really all I'm interested in. I was always taught look at the data every way you can, put it in, pull it out, see if you can come up with differences. If you can't, that reassures me about your database being complete.

DR. CHALMERS: Okay. All right. I just wanted to get a little better idea of what you were thinking. And I'll talk to John and we'll -- we'll see if we can come up with something.

MEMBER ZIEMER: Okay. Thank you.

CHAIR CLAWSON: Yeah. Nancy, I'm glad that -- I'm glad you did that clarifying question because a lot of times when you deal with Lockey it's pretty abstract. That's why he wants to meet in person with me.

MEMBER LOCKEY: No, I just want to see if you're as old as you look.

CHAIR CLAWSON: Well, I appreciate that. As all -- you know, I want to express something. We have some very heated conversations sometimes, and we all have different opinions and everything else, but I wanted to take this opportunity and be sure to tell everybody how much I appreciate what you have done, the efforts that you've gone to. even though we don't agree on some things, I just want you to know I appreciate the work. And I'm sure that the workers that we represent also appreciate it too.

So, with that being said, are there any questions out there that that

need to be answered before we come to close of this work group?

DR. DEGARMO: Mr. Clawson, this is Dr. DeGarmo. Please excuse my forwardness, but I would like to respond to the question that Dr. Ziemer raised about having someone contact the sources that be that have made this decision to not allow certain Members of the Board to participate.

CHAIR CLAWSON: We don't have people comment, but we were called out in name, so I believe it'd be all right to go ahead if it's a short comment.

DR. DEGARMO: Very short. Dr. Ziemer, I just want to let you know that this issue has already been raised, and I plan -- after seeing what happened today and getting a real vision on it, I plan to write a follow-up letter that will be sent to the U.S. Senate Committee on Health, Education, Labor, and Pensions, specifically Bill Cassidy and Bernie Sanders. I have also been in touch with Secretary of Health and Human Services, Secretary Becerra. Another copy will be sent to the Secretary of Labor, Secretary Su, and another issue -- another letter will be sent to President Biden at the White House. This has been my chain of contacts with any concerns I have had about the SEC program. So, I did want to let you know that at least we are aware as petitioners of your frustration because we share that with you. Thank you.

MEMBER ZIEMER: I'll just add a comment here that of all those that you named, there's not one that has jurisdiction over this committee. There's some that have administrative responsibilities, but the only one with

jurisdiction is the White House. And we have had in the past senators who have demanded certain things of this committee, that had occurred when I was chair, and I told them abruptly they have no right to demand anything, and we're not doing it. So, if those others have any influence on this decision, they're way out of the line. But that -- I'll stop there, otherwise I'll get off on a tangent here.

Thank you, Brad. Appreciate your leadership today.

CHAIR CLAWSON: Oh, no problem.

Thank you, Mr. -- Dr. DeGarmo. I appreciate that, and I'm sure we'll take that into consideration. So, with that being said, Rashaun, I'd like to bring this work -- Savannah River Work Group to an end. Anybody opposed?

MEMBER LOCKEY: No, I wanted to continue for another two days, Brad.

CHAIR CLAWSON: Well, you know, I can do that, James. With that being said, everyone, thank you so much for your work. And we'll continue on until we bring this work group to an end, and thank you all for participating.

(Whereupon, the meeting was adjourned at 3:45 EDT.)