Centers for Disease Control
National Institute for Occupational Safety and Health
Advisory Board on Radiation and Worker Health
Savannah River Site (SRS) and SEC Issues Work Groups Joint Meeting
Friday, December 6, 2019

The Work Group convened in the Cincinnati Airport Marriott Frankfurt Room, 2395 Progress Drive, Hebron, Kentucky, at 8:30 a.m., Eastern Time, Henry Anderson and Bradley Clawson, Work Group Chairs, presiding.

Present:

Henry Anderson, SEC Issues Work Group Chair
Bradley P. Clawson, SRS Work Group Chair
Josie Beach, Member
James E. Lockey, Member
Genevieve S. Roessler, Member*
Phillip Schofield, Member*
Paul L. Ziemer, Member

Also Present:

Ted Katz, Designated Federal Official
Matt Arno, ORAU Team*
Bob Barton, SC&A
Liz Brackett, ORAU Team
Ron Buchanan, SC&A*
Grady Calhoun, DCAS
John Cardarelli, DCAS
Nancy Chalmers, ORAU Team
Josh Fester, on Behalf of the Petitioner*
Joe Fitzgerald, SC&A
Rose Gogliotti, SC&A*
Warren Johnson *
Mike Mahathy, ORAU Team*
Jenny Naylor, HHS*
Knut Ringen, CPWR*
Mutty Sharfi, ORAU Team*
Dan Stempfley, ORAU Team*
John Stiver, SC&A*
Tim Taulbee, DCAS
* Participating by phone

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Proceedings

(8:32 a.m.)

Roll Call/Welcome

Mr. Katz: So good morning, everybody. This is the Advisory Board on Radiation and Worker Health. It's a joint Work Group meeting of the Savannah River Site Work Group and the SEC Issues Work Group.

And we were dealing with -- yesterday we dealt a lot with the guideline for the coworker models and discussing -- uh oh, I'm getting a -- hello? Okay, it's all right.

Participant: Hello?

Mr. Katz: So whoever is on the line, can you just mute your phones? *6 to mute your phone.

Anyway, so yesterday we had a lot of discussion about the coworker models in relation to the Savannah River Site coworker models to sort out the guidelines that NIOSH uses to develop coworker guidelines. And today we're going on with the rest of more -- to more focus on the SRS issues particularly.

So the materials for today's meeting are -- that are available for the public, not everything can -- could have been -- could be cleared through DOE and all that, but everything that's available for today, including the agenda, is posted on the NIOSH website under schedule of meetings, today's date. So you can find those materials there and follow along and also see some of the background materials that these discussions are based on.

What else? For phone, just let me just again note keep your phones on mute. You shouldn't be -- have your phones open except when you're addressing the group.

There is no public comment session, but there is an

opportunity for the petitioner at some point before we close where the petitioner will have an opportunity if the petitioner has comments. So we'll note that. That will be later this morning, I'm sure.

And the meeting is breaking today, is ending today at noon. So that's -- that's the schedule.

Roll call. So I'm going to do roll call, and as we did yesterday and always, conflict of interest because there's a site involved here.

Board members that are involved in these two Work Groups don't have any conflicts with Savannah River Site, so we don't need to address that.

I'll run through roll call, and I'll cover all the people that are in the room since I can see them here, and then we'll go to the phone for Board members, then we'll go on to the rest.

(Roll call.)

Mr. Katz: Okay, then. So then without further ado, just again remind please keep your phones muted, and *6 if you don't have a mute button, and let's go.

Mr. Fitzgerald: Okay.

Mr. Katz: Joe.

Review of ORAU RPT 92

Mr. Fitzgerald: Yes, thank you, Ted.

Joe Fitzgerald again, and I'm going to start off the presentation on SC&A's review of the RPRT-92, which was the evaluation of bioassay data for subcontracted construction trade workers at the Savannah River Site.

And just a little background. Well, let me -- let me first, I know Tim acknowledged the ORAU and the NIOSH team. I just also want to acknowledge the work that they've done over the last year and a

half.

Member Roessler: Joe, may I interrupt? There's nothing showing on the Skype screen.

Mr. Fitzgerald: No, this isn't on Skype.

Participant: Bob, can you put it on?

(Laughter.)

Mr. Fitzgerald: Yeah, it's going to be put on Skype right now. And I'll try to be very careful about giving you the run through.

At any rate, again I want to acknowledge the work that the NIOSH and ORAU team, and I'm talking Mike, Dan, and the rest, it was a -- you know, I think it was a pretty tall order. And I agree it was a lot of work, so I just want make sure it's clear that we understand that as well.

What I want to do from the SC&A standpoint is, you know, step back a little bit and look at the overall project. We've been pretty much focused I think with the 1990s, the '97 notice of violation. I mean there's a history on this that we've gone through the last couple of years.

But I want to certainly today walk through the '72 to '98 in its entirety and look at it in that perspective. And we're talking 27 years, so it's a fairly long period that's under consideration. And I think that's part of our review that we wanted to look at it from that standpoint.

And as with OTIB-81, I think a lot of the issues, this is certainly for the Work Group, a lot of the issues that we're addressing are pretty fundamental ones. And I think are going to help define how the coworker models applied. I mean I'm talking about the guidelines.

So this is really in addition to 81, taking the guidelines and applying it to Savannah River, I think 92 in some respects, is also a way to take a lot of

those guidelines, interpret them, and apply them to a particular circumstance or circumstances at Savannah River.

And so these have some, I think, pretty fundamental implications for how one views the guidelines, how one applies those in terms of the coworker model. So this all relates, I think, to what we've talked about for the last day or so.

Okay, so first, again the -- what we call subCTWs, which is short for the subcontractor construction trade workers, you know, it's pretty clear they often performed the non-routine jobs at the sites, and this is not just Savannah River, across the DOE, involving unique radiological source terms or conditions, and these -- and they required a lot of times the RWPs, the permit required bioassays to verify whether or not intakes occurred.

Now, I think Tim has made it clear there was other ways one could monitor, but clearly the bioassays were a important component of verifying intakes.

SC&A's original evaluation of subcontractors, and this is going back to 2017, you know, we found the incompleteness in the range of 66 to 84, but in the range of that spectrum and concluded RWPs before 1999 were likely not complete nor consistently applied with respect to job-specific bioassays.

So that's from our 2017 review, and that review also cited the -- the Westinghouse findings of incompleteness in 1997 that we talked about at some length yesterday.

And, again, that was a 100 percent review of RWPs in 1997 and found 21 percent incompleteness. And that was the basis for the 1998 DOE enforcement action, a very significant action, that involved a penalty at Savannah River, and also contributed to a departmental decision at that time in 1998 to have a complex-wide moratorium on enforcement actions relative to bioassays so that the complex could, in fact, take corrective actions to self-assess

and take corrective actions in a rather prompt manner.

So this was a significant and compelling issue that faced the Department of Energy in '97 and '98, and therefore we thought it was equally compelling that this program needed to consider that issue and the implications of that issue.

This is --

Member Ziemer: Joe, could I just interrupt very quickly?

Mr. Fitzgerald: Yes.

Member Ziemer: So you said the finding was 21 percent incompleteness, and I think, just for the record, I think you meant 21 percent completeness.

Mr. Fitzgerald: Oh, I'm sorry. Yes, if I said incompleteness, it's completeness.

Member Ziemer: I don't know if Jim has the slides yet, but just.

Mr. Fitzgerald: Okay. Yes, excuse me. That would be 21 percent completeness or conversely the 79 percent incompleteness.

Member Ziemer: Right. And that refers to the slide that Tim talked about where it was 21 percent of a subset?

Dr. Taulbee: Twenty-one percent of 5 -- 5 percent of the job-specific --

Member Ziemer: Right, yes, okay.

Dr. Taulbee: -- bioassay.

Member Ziemer: Just trying to correlate in my mind, okay.

Dr. Taulbee: So it is not 21 percent of all bioassays.

Mr. Fitzgerald: No, this is job-specific bioassays. But I wanted to make sure it was clear that --

Member Ziemer: Yeah.

Mr. Fitzgerald: -- the significance of lacking that completeness in terms of submission of bioassays for RWP required bioassays was significant not only to Westinghouse, but also to the Department of Energy.

Member Ziemer: Thank you.

Mr. Fitzgerald: So this was not a passing issue; this was a fundamental issue. And I don't recall their being too many moratoriums on the Price-Anderson enforcement across DOE, so this was taken pretty seriously.

Did you have a question?

Member Lockey: Joe, could I ask you something about the second bullet point?

Mr. Fitzgerald: I'm sorry?

Member Lockey: The second bullet point you have on the background.

Mr. Fitzgerald: Go ahead.

Member Lockey: Is -- you said 66 to 84 percent completeness, correct?

Mr. Fitzgerald: That's correct.

Member Lockey: And then you went on and said the RWPs before '99 were neither complete nor consistently applied. So those are two different statements, is that --

Mr. Fitzgerald: Right, there's two different issues here. We did our own review, which was the Board mandate back in 2017. We were tasked to do a broad sampling review --

Member Lockey: Of the RWPs.

Mr. Fitzgerald: -- of the RWPs --

Member Lockey: Yeah.

Mr. Fitzgerald: -- that we could identify. This was similar to what NIOSH, not identical, but similar to what NIOSH had done for '91 to -- I'm sorry, '81 to '86 for 773-A. They're sort of in parallel.

And our initial indication and because this was a, you know, a preliminary sampling, it was a indication that that was the percentages we were looking at. Now they weren't that dramatically different than what was found at 773-A or what has subsequently been found, somewhere in the neighborhood of 70-80 percent, maybe up to 90 percent depending on how you adjusted that for long-lived nuclides.

Member Lockey: So when you say they weren't complete, what does that mean? When they need their complete -- what does that mean?

Mr. Fitzgerald: That means we could not establish a job-specific bioassay. In the case that got reviewed in 2017, we couldn't find a job-specific bioassay tied to that RWP within I think it was 30 or 90-days.

Member Lockey: Okay.

Mr. Fitzgerald: Of the -- of the RWP.

Member Lockey: Got you.

Mr. Fitzgerald: And we've had subsequent discussion, I won't go through that right now, about how one would adjust that for long-lived nuclides. But certainly we felt -- well, actually we found that there was a level of incompleteness.

Now we're going to get into the question of how incomplete is incomplete. That's another, you know, and that's -- that's a judgment call. But basically, that's what we came out with in that timeframe.

Member Beach: Joe, you should put your pin in before it kicks you out.

Mr. Fitzgerald: Oh.

(Laughter.)

Mr. Katz: You can just -- actually you can just close that because you don't need it.

Mr. Fitzgerald: Okay.

Mr. Katz: There you go.

Mr. Fitzgerald: In any case, the Savannah River Work Group Board members, requested NIOSH conduct further evaluation of the subcontractor data completeness for '72 to '98. This is the RPRT-92 that we're discussing now.

And I think the significance of this is that it was felt by the Board at that point in time, and this is available in the transcripts, that the review that we did, which was a preliminary review focused on, frankly, just a few years in the '90s, and the NIOSH review up to that point, which was focused on one facility from '81 to '86, wasn't of sufficient scope.

I'm talking about sufficient facilities or sufficient timeframe to really provide a good answer to the question of the completeness of the data and the representativeness of the data. So from that vantage point, the Board was looking for a more fundamental review of that issue.

I think the next slide is basically the '92 review, and Tim pretty well covered that, so with your permission, I'm going to skip most of that. I don't think there's anything here that we haven't already talked about.

We did comment on the sampling plan; we did express in particular a concern over the 1972 to 1989 DuPont era. That was a, in fact, an appendix to our comments on the sampling plan, and we felt that was going to be an issue. Because even as

early as the sampling plan, I think NIOSH recognized the availability of permits and, you know, plans were going to be sketchy at that stage.

So we had some concern over that.

Co-Chair Anderson: Do we have a sense of what started this was the identification of a lot more boxes, and I'm wondering how much did the new records contribute?

Mr. Fitzgerald: Well, I think, you know, clearly --

Co-Chair Anderson: Well, I'm just, I mean partly it cost two years to process all of this, and I just want a sense of was it -- was it worth the effort or?

I mean in hindsight at the time, we --

Mr. Fitzgerald: Are you asking Tim or I?

Co-Chair Anderson: Well, either of you how you felt about it.

Mr. Fitzgerald: Okay. Well, I think --

Co-Chair Anderson: Could you tell?

Mr. Fitzgerald: Well, you know, I -- one, if you go back to 2017 there was a frustration. And, you know, I was down in the trenches with Mike, Dan, and the rest as well, and Tim looking for records.

Co-Chair Anderson: Yeah.

Mr. Fitzgerald: And permits were very hard to find. We went through EDWS and all kinds of other sources, and we found what we could find. But they were not complete in terms of years and particularly not complete in terms of decline. But you know, in particular, it was hard to go backward in time and find the records that would enable you to look at that.

And we had I think reached a point where, you know, the question before all us and the Board in

particular, well what do you do about the issue. You know, we can't really take the findings that we had for '97-98 where there's some, you know, measure of incompleteness, and decide if that incompleteness would typify the years before that.

And that was the question as far as the SEC period. And we can't just answer the question for '97 or '96 or '98, what's the answer for the entire spectrum?

Dr. Taulbee: And if I could?

Mr. Fitzgerald: Yes. I'm sorry.

Dr. Taulbee: And where I think that the -- the benefit from that evaluation was is that we were able to more completely fill in back to 1991. So we were able to clearly answer from '91 up through '98 with that additional records.

Co-Chair Anderson: So the records were mostly '91 to '98?

Dr. Taulbee: Well, yes and no, because --

Co-Chair Anderson: Well, we don't need to dwell on it, I'm just again, you know, there was today --

Mr. Fitzgerald: There was additional job plans that we --

Co-Chair Anderson: -- you stressed on how much time and effort and everything it took, and I -- I would like to --

Mr. Fitzgerald: Well, the expectation --

Co-Chair Anderson: -- just confirm it was helpful.

Mr. Fitzgerald: Yeah. The expectation was -- or hopefulness was that there in fact would be enough records to fill in the blanks.

It turns out the records, I think, were available for 773-A, you know, which was the facility that was reviewed back in -- for the '81-'86 period. And it

also was for the Westinghouse era, but became diminishing returns after that.

So, but there was no -- there was no anticipation of that before going into it.

Co-Chair Anderson: Okay.

Mr. Fitzgerald: It's just that was the result of the review.

In any case, the -- that obviously influenced the sampling, and, as Tim explained yesterday, whereas one was able to do a statistics-based random sampling with all the bells and whistles and a very good review of the 1990s, we were sort of stuck with what we had in the past with some augmentation for '72 to '89.

Co-Chair Anderson: Yeah.

Mr. Fitzgerald: And we'll go into that, but that, you know, that, you know, could not be handled the same way.

Okay, from our -- switching to what we did. We, when we got the report, and again, it was a fairly detailed report, but it was pretty clear it went into a number of different aspects of this review. It was very comprehensive.

So we wanted to have an equally comprehensive evaluation. And so we wanted to look, we wanted to start from the get go looking at sampling premise and the assumptions because again, on something like this, the assumptions you make have a fundamental effect, and I think we'll go into this to some degree, on what results you end up with. And we wanted to be sure that we were able to probe that. You know, what are the assumptions, and what are the -- what is the premise behind the sampling that was done?

The second aspect on the execution, I think it was clear that certainly NIOSH was going to randomly

select radiological workers, and do the evaluation of, you know, comparing monitored to unmonitored. But in terms of how that was done, were the considerations and the factors, and the adjustments, and how the assumptions were applied, was that done and executed in a sound manner, and do we have any issues with that?

And, finally, on coworker datasets, and this gets back to the implementation guidelines, this is the tie-in I was talking about. Did the evaluation state -- satisfy the guidelines in terms of demonstrating that the monitored subcontractors and the unmonitored subcontractors in fact work side by side in the same radiological environment and would have had the same comparable exposure potential. So that fundamental question.

So we did look at it from those three standpoints. And we chose -- and this -- this came from, I think, NIOSH's experience as well, that we chose to look at two distinct Savannah River operational periods. It was pretty clear that, you know, we had spent most of our time focused on the 1990s and the Westinghouse era, and we had not spent as much time looking at the DuPont era even though that actually, relatively speaking, constituted more of the time period.

So we wanted to actually look at those two distinct operational periods. Two different contractors, and as we'll get into it, we believe two different operational philosophies and management approach, as well as procedures. And I think there is a distinction between those time periods.

And, finally, we wanted to test the thesis. I think this gets down to the foundations for the review. Can, in fact, bioassays be linked to the corresponding work permits that the monitored and unmonitored CTWs -- subCTWs can be compared? I mean, that's the final bottom line.

Okay, so for the first one, the -- our first finding, SC&A, this is the assumption and basis for

subcontractor data sampling. This is now we're going to focus on '72 to '89, and I want to make it clear that the -- we did take these by period.

So all of the findings I'm going to discuss, the context of what I'm going to discuss, is the DuPont era, what Tim was calling the mid- and late DuPont eras, 1972 to '89 is what we're addressing from my discussion. And we'll switch to Westinghouse at the end, but right now we're talking about the DuPont era.

Okay. Our first question, which is our first finding, since we're looking for permit indicated or required job-specific bioassays and trying to establish completeness, you know, what is the relationship. Can we actually find job plans in this case, or special work permits that have job-specific bioassays associated with them?

I mean this seems kind of a straightforward question, but as we examined the actual results and the experience of doing the evaluation, it became clear to us that we could not actually identify a good linkage between the DuPont SWPs, special work permits, or the job plans to job-specific bioassays.

We looked at the procedures, we looked at policies, we looked at the SWPs themselves. We looked at the job plans, and all we are looking for is some indication that, in fact, the bioassay was tied to any of those documents, that, in fact, you could survey the job plans and find a related bioassay.

Because you're really measuring completeness, so therefore you have to establish that there's some relationship there. And in particular we looked at the special work permits, which actually resemble and mirror what we, you know, we understand as radiological work permits, RWPs. They actually do have a box that you can check off requiring job-specific bioassay.

Yeah?

Dr. Taulbee: And what Joe is pointing out is correct. On the SWPs there is a bioassay box. Those were beginning to be phased out in 1972, at the beginning of this.

Mr. Fitzgerald: Right.

Dr. Taulbee: The job plans did not have a box.

Mr. Fitzgerald: Right, I'm going to get to that.

Dr. Taulbee: For bioassays.

Mr. Fitzgerald: Right, and so we looked at the SWPs in the 1970s, and they were being phased out, but they were actually still in use through most of the '70s. And we did not find -- and, again, we looked at all of them, all the SWPs we could find in the '70s and early '80s. There were a few in the early '80s.

And none of the job-specific bioassay requirement boxes were checked. And that led us to say okay, that's kind of curious because, again, given the numbers involved and the -- and the operations involved, you would expect to see some linkage with a bioassay being required for a SWP.

The job plans, as Tim just pointed out, were more extensively used. In fact, took over and were used for the '70s and '80s, and that's a little more difficult. Because as Tim points out, the job plans don't have a check off.

In fact, the reliance was on the managers, you know, using the DPSOLs, the procedures and the guidance in the procedures to decide when a bioassay would be required on a job-specific basis. And they were very general.

I mean it's not, you know, it was -- I would call it a performance-based procedure. If you, you know, have these considerations, then you have the leeway and ability to do a bioassay. But it wasn't one of these one for one requirements or check offs

that you could trace as easily.

Member Ziemer: Joe, could you just remind us a job plan might have a number of SWPs under it, is that how it worked?

Mr. Fitzgerald: No.

Member Ziemer: No, it didn't?

Mr. Fitzgerald: No, no.

Member Ziemer: So then what is the difference between the job --

Dr. Taulbee: The job plan covered the task that was to be done. It was a different form of an RWP, kind of they -- they initially had these safe work permits which were much closer to RWPs. They went to these job plans which would just list the tasks, the PPE required, and sign in and sign out.

And so it wasn't as -- well, Joe's got an example there to show you.

Mr. Fitzgerald: This is a job plan, and the -- what I'm showing to those of you on the phone is --

Member Ziemer: Now --

Mr. Fitzgerald: -- in the report we have --

Member Ziemer: -- I saw --

(Simultaneous speaking.)

Member Ziemer: I was trying to -- I had in my mind that a job plan was a bigger thing, and that there were a number of tasks under it that might have --

Mr. Fitzgerald: No.

Member Ziemer: Oh, okay.

Mr. Fitzgerald: Yeah, the job plan is exactly that, it was a form.

Dr. Taulbee: They're a package.

Member Ziemer: If there was a job plan, there wouldn't have been an SWP, is that what you're saying?

Mr. Fitzgerald: No. They supplanted the SWP.

Member Ziemer: I got you.

Mr. Fitzgerald: Although there was an overlap.

Dr. Taulbee: There was an overlap --

Mr. Fitzgerald: Right.

Dr. Taulbee: -- there's times when they're using both.

Member Ziemer: Thank you, that clarifies it.

Mr. Fitzgerald: But, you know, when we --

(Simultaneous speaking.)

Mr. Fitzgerald: -- we talk about, when we talk about the classic RWP that, you know, we were familiar with in the 1990s that Westinghouse implemented, and actually across --

Member Ziemer: Right.

Mr. Fitzgerald: -- the complex what we knew of a radiological work permit. The SWP came a lot closer to resembling that than the job plans.

Member Ziemer: Right. And the policies might still say you should have a bioassay if you did this kind of work, but it wasn't specifically --

Mr. Fitzgerald: No.

Member Ziemer: -- showing up, wasn't that --

Mr. Fitzgerald: It was general --

Member Ziemer: Yeah.

Mr. Fitzgerald: -- and I think there's no disagreement it was general.

We did go through a lot of review of what procedures they actually had through the years in the DuPont era, just trying to figure out did they ever get any more explicit about the job-specific bioassays being required of line managers, you know, looking at the DPSOLs. And, frankly, it provided the ability to ask for bioassays, but there was no explicit requirement.

So, anyway, the -- and we also did the same for looking for procedures under DuPont where respirator use would be, in fact, required. Oh, I'm sorry, job-specific bioassays would be required when respirators were used. And, again, did not find the linkage.

Go ahead.

Dr. Taulbee: Just to clarify from our standpoint, that was the trigger that we used on the job plans is if somebody was required to wear a respirator, that was our trigger for required bioassay.

Now that wasn't by procedure, it wasn't required, it wasn't written down that they had to send people for bioassay at that standpoint, but that was the standard we used in RPRT-92 in looking at the job plans when it wasn't specified, was were these workers required to wear a respirator? A respirator or full line -- well, full line respirator --

Member Ziemer: And were you assuming --

Dr. Taulbee: We're assuming --

Member Ziemer: -- that under the policy they would have? Even though they didn't designate it?

Dr. Taulbee: We were assuming that by today's type of standards, if somebody's in a respirator, they're going to be on a bioassay. That was --

Member Ziemer: It wasn't explicit?

Dr. Taulbee: No.

Member Lockey: So that's when you looked if they -- if they had a respirator, was there a bioassay associated with it?

Dr. Taulbee: That's exactly right. Yes, sir.

Member Lockey: But that was never written down?

Dr. Taulbee: That's correct.

Member Lockey: I got you.

Mr. Fitzgerald: Okay, so really the finding here is that we wanted to start with the fundamental question of, you know, what are we evaluating and is there, in fact, evidence that a job-specific bioassay program tied to permits, job plans, whatever you want to call it, existed in the DuPont era, and we weren't able to find that.

So, I mean --

Member Lockey: Can I ask you a question?

Mr. Fitzgerald: Yeah.

Member Lockey: So did the job plans or the SWPs say anything about respirator, required respirator use?

Mr. Fitzgerald: Yeah, respirator use was a check off box on the SWP, and there was a actual yes or no thing in the job plan for either on soft mask or something, a respirator, yes. So it was actually covered in both.

Member Lockey: Okay, so if the job plan required respirator use, it was -- that was checked off. And what I'm taking is that when you saw that, then you assume is there any bioassay and searched there?

Dr. Taulbee: We started looking for everybody who worked in that job plan, did they have the bioassay?

Member Lockey: Okay.

Mr. Fitzgerald: So, anyway, the finding is just that. I mean we're not trying to judge the decision to look for bioassays, just saying that before we go much further, the distinction between the DuPont era and the Westinghouse era is that you do not have that linkage, as far as we can find, in procedures or policies under DuPont.

And practices. We looked at log books, and we just couldn't find it. So there is that distinction between the two operating eras.

Okay, for finding 2, what we wanted --

Member Lockey: Let me -- let me ask you about that.

Mr. Fitzgerald: Oh, I'm sorry.

Member Lockey: I'm sorry; I have to ask you one more time. So you say there was no link between the SWPs and specific bioassays?

Mr. Fitzgerald: Right.

Member Lockey: But NIOSH found a link between a check on respirator use in bioassays?

Mr. Fitzgerald: No. I think what they're saying is they assumed that the bioassays would be a follow on to the respirator use as part of their evaluation in 92.

Member Lockey: Okay.

Dr. Taulbee: Basically, we figured that people who were wearing the respirators were at a risk of inhaling radionuclides, and so from a follow-up standpoint of contamination control, that final verification would be the bioassay.

So we would go and look and see were these people on a routine bioassay, a job-specific bioassay? It didn't matter. Was there a bioassay that related to what that exposure was that we could estimate?

Member Lockey: Yeah, well the flip side of that were people -- did you look at people wearing respirators who weren't bioassayed?

Dr. Taulbee: Whenever somebody -- we looked at all subcontractors that wore a respirator. And if somebody was not monitored for bioassay, then we went and looked to see if there were any coworkers.

So, yes, we did look, if they don't have bioassay, we then took the next step to see if somebody else on that job plan did have a bioassay. Does that make -- does that answer your question?

Mr. Fitzgerald: That's -- they're asking a different question.

(Laughter.)

Dr. Taulbee: Ask the question again. I'm sorry.

Member Lockey: What I was asking is, I'm trying to establish -- I'm trying to figure it out. Was the respirator, was -- if I'm requiring -- if we're in an SWP or a --

Mr. Fitzgerald: Right, job plan.

Member Lockey: -- and in there it says the respirator is checked, the assumption was -- or maybe management says we have to do bioassays on these people.

Mr. Fitzgerald: No. There was no -- there was nothing in the procedures or policies that would have obliged management to do a bioassay. And we looked hard at that particular issue. We did find a requirement put on the books by Westinghouse in 1991, I think, that actually made it explicit. But before that, we could not find evidence that there was a one-for-one requirement to do that.

I think what Tim was explaining that he -- he was, for the purposes of the 92 review, making the assumption that that would have been the case. But there's nothing that I can find that says that

that was a requirement.

Dr. Taulbee: That's correct. What Joe's saying there's no policy, there's no procedure that said if you put people in a respirator, they need to leave bioassay.

So --

Member Lockey: All right, so my question is if we assume that was the case, did you find that what you found verified that, if you were in a respirator, you got a bioassay done?

I guess that's what -- that's my -- that's --

Mr. Fitzgerald: If they were in a respirator did they have bioassay done? Well, in the 1980s, generally yes, that is the case.

Member Ziemer: You're sort of asking that question of --

(Simultaneous speaking.)

Member Ziemer: -- did we miss a lot of -- were a lot of bioassays not done because they didn't have the box checked is sort of that question, and the reverse is are they getting the bioassays regardless of whether the box is there or not?

Member Lockey: No, my question is if the respirator box was checked, did they get -- was bioassays done? That's what I'm asking.

Dr. Taulbee: And that was the question that we addressed. Was if that respirator box was checked, did they have bioassay, yes or no.

Member Lockey: Okay.

Dr. Taulbee: And so our goal was to determine what percentage of the people who were wearing respirators exposed to this airborne environment, who were subsequently -- left bioassay samples and they, therefore, would be represented in the

coworker model.

Mr. Fitzgerald: But -- and also recognize the consideration that this includes workers that were doing a pre-scheduled cycle. I mean --

Dr. Taulbee: Not necessarily.

Mr. Fitzgerald: Well, no, but I'm just saying that you, for the longer-lived nuclides, you were considering those as well.

Dr. Taulbee: Yes.

Mr. Fitzgerald: So that added into the percentages. So, you know, workers were on pre-scheduled for plutonium, what have you, every two or three years, or even four times a year as we heard earlier.

So the fact they had a respirator checked off on a particular job plan, they, if they were on a pre-schedule to get bioassayed anyway, that would have been counted as a match. It wouldn't have been specific, you know, to that respirator use that they got that bioassay.

They were on the cycle of being reviewed anyway routinely. So it's a little more complex.

Member Lockey: You see why I'm trying to ask, you understand where I'm --

Mr. Fitzgerald: Yes, and I -- our, you know, there's two things going on. You know, you have the evaluation and how that was done, but the reality of the operational practice and procedures is another thing, too.

So that's another dimension which I -- we felt didn't really get presented in the review that was done.

Co-Chair Anderson: That wasn't the charge question.

Mr. Fitzgerald: Well, it wasn't -- well, the charge

question was look at completeness. But I think the context is important to understand that when we were evaluating completeness using these assumptions, and recognize that we're looking at the premise of the review.

And one of our fundamental findings is be clear that the DuPont era, there wasn't a linkage in procedures or policies for that to happen based on a coded or respirator use.

So we can do the evaluation and make that assumption, but it's not tied to the actual practice on the ground. And that -- I think that's got to be, you know, that's got to be clear, and one has to look at the implications of the results in that -- in that way.

Member Lockey: Yeah, so there was no management regulation says if you wear a respirator, you need to get bioassay done?

Mr. Fitzgerald: No. And, you know, yeah.

Member Lockey: The assumption you made if they wear a respirator there's a --

(Simultaneous speaking.)

Member Lockey: -- bioassay. So the question is --

Mr. Mahathy: This is Mike, Mike Mahathy if you can hear me?

Mr. Katz: Yes, we can hear you.

Mr. Mahathy: There was a requirement for a person to be on a respirator, wearing a respirator, to also be on the bioassay program. I'd have to get that, find that document, but that linkage was there.

Dr. Taulbee: What time period, Mike? We're talking about --

Mr. Mahathy: '70s, '70s and '80s.

Member Lockey: I missed what he said.

Dr. Taulbee: He said that there is some documentation that if somebody is on a respirator, that they were required to be on a bioassay schedule.

Mr. Mahathy: On the routine bioassay.

Dr. Taulbee: On a routine bioassay.

Mr. Fitzgerald: Not job specific though, or permit required or?

Mr. Mahathy: No, because they didn't have a permit. They didn't have job-specific bioassays in '70s and '80s.

It was basically if you were on -- you were on a routine bioassay and if your sample came up high, they did a special bioassay.

Mr. Fitzgerald: And certainly, the question --

(Simultaneous speaking.)

Mr. Fitzgerald: -- yeah, the question, Mike, would also be if you were on a -- if you were a subcontractor on an intermittent work and you were on a job plan, if that respirator box was checked, would you be required to leave a bioassay because of that job or not. I mean if you were --

Mr. Mahathy: Yeah, that's the question. I don't know.

Mr. Fitzgerald: Yeah, I know. I think if you were a standard worker and you were in respirators all the time, I think it would be very -- it would be very clear that you would -- you would be leaving bioassays. I don't think that would be in question. But I think we're trying to make that distinction, as well.

Okay, let me proceed to finding 2.

Co-Chair Anderson: Thank you.

Mr. Fitzgerald: Okay, so we turned to the other premise on the evaluation and wanted to kind of understand that better, which is the radionuclides of interest.

And here again, we wanted to look at the DuPont perspective of how things were done. And, you know, one concern we had going in, you know, there was a very thorough characterization approach that was developed by Westinghouse.

And the Farrell and Findley paper I think goes into some lengths to describe how one can go about doing a comprehensive source term characterization, and there's no fault with that. I mean I think that's, you know, that's the Cadillac version of how one does it.

But our concern was more on using some of those guidelines going backwards and trying to establish, you know, what source terms ought to be addressed in the evaluation. This is the 92 evaluation, RPRT-92 evaluation for the DuPont era.

There, we looked at the policies, procedures, and findings that were conducted back in that timeframe and don't see, again, evidence that DuPont necessarily exercised the same degree of scrutiny or analytic capability to look at the various source terms that figured in the facility operations.

And I'm not talking about the fundamental, you know, you have the canyons, they did this, you have the reactors, they did this. You know, tritium in the reactors, plutonium in the canyons.

I'm talking about the laboratory operations, the waste management operations, tank farm operations, where the source terms are a little more complicated, and where you have a variability in what was being handled, and where you're talking about specific jobs, tasks, that were given subcontractors day to day, year to year, that would

have been highly variable.

And if you're talking about a laboratory environment, you're not talking about what comes over the transom's going to be the same year to year -- year to year or even week to week. It's going to vary.

And that was actually acknowledged in later Westinghouse reviews of even 773-A, that you had to be careful about how one does characterization for a laboratory facility for that reason.

And in 1990, you know, this is during the March 1990 Tiger Team. And I want to make one thing clear. You know, DuPont really did not have much in the way of external reviews. I mean, I -- I recall three major external independent reviews that took place when DuPont was there, and the third one actually happened -- the Tiger Team happened about eight, nine months after DuPont left.

So that it looked at DuPont practices before Westinghouse revamped them. But DuPont was gone by then.

You know, the National Academies came in in 1987 to look at the reactors. You had the P reactor restart in 1988, that was August of '88, and that led to congressional hearings about, you know, nuclear safety and management at the Savannah River reactors. And you had the Tiger Team that looked at everything basically in March of 1990.

And the Tiger Team, and particularly on this particular question of radionuclides of interest, found that the radiological areas at Savannah River, and this is a quote from the report, have not been sufficiently characterized to provide a technical basis for the assignment of bioassay sample type and frequencies.

Now this was the table that I think Tim showed us an example of yesterday, sampling types and frequencies. And they really found only one facility

on the Savannah River Site, and this was the naval facility.

And actually, the naval facility was a bit of an anomaly. That was under Naval Reactors, and as Paul will appreciate, Naval Reactors had its own little thing going, and so they weren't really under Savannah River, per se.

But they were the one facility that the Tiger Team established actually had a comprehensive source term characterization program where they actually had an analytic approach and looked at the source term in that comprehensive manner. And they cited non-compliance with the DOE order for the balance of the facilities at Savannah River.

The reason I'm raising this is I think for that DuPont era, you did not have the level of analytic review that NIOSH has pointed to in terms of the Farrell and Findley and the Savannah -- what would be the Westinghouse approach. It was more of an expert-based, experience-based approach to identifying what radionuclides were of significance and consequence at different facilities.

And not to belittle that, DuPont had a high level of expertise and a high level of safety consciousness. I mean corporately, I think DuPont had no parallel at the time in terms of a safety culture. But the one problem with DuPont, and this was reflected in the problems with the reactors and the reactor restart in '88, is that because they were isolated from developments in the nuclear -- commercial nuclear industry and what have you, there was insularity that grew at DuPont.

They, you know, they had their own safety culture, they operated -- well, they almost operated in a bell jar. They had their own approach to how they did business, and it was -- a lot of it was based on their expertise.

DuPont actually built and ran the Hanford reactors, and that's why they were selected to build the

Savannah River reactors. And from 1951 forward, they actually operated those facilities to great success.

Now the design and the operations were based on 1950s engineering and technology, and they developed that over the years. But, nonetheless, they had no external oversight, no external review.

And that was the -- that was the problem that arose in the '80s because given Three Mile Island, Chernobyl, and the rest, the scrutiny on DOE's reactors got to the point where they were exposed. The operations were seen as out of step with what accepted practice would be.

So in terms of the -- this issue of radionuclides of interest, I think this external review kind of put the spotlight on the fact that the bioassay sample type and frequencies, the ones that were in fact, in the Appendix on 81, but certainly figures in the 92 review itself, may not be, in fact, an accurate reflection -- accurate reflection of -- I just lost the picture here, didn't I?

Dr. Taulbee: Joe, can I ask a question here?

Mr. Fitzgerald: Yeah.

Dr. Taulbee: I'll wait till you get your screen back up.

When you were doing your evaluations of -- or in coming up with this finding, did you consider or look at Farrell and Findley as to how much it changed from 1972 up through 1999 for these various areas?

Mr. Fitzgerald: No, what I looked for, really, was the granularity as far as whether or not there was any acknowledgment of other source terms that may have existed at the laboratory, for example at the 773-A and the waste management, whether waste management was treated or not.

And I will again point to this particular question

because the answer -- the answer that -- and this was a 1990 outside -- the answer that Westinghouse gave to this particular finding was that they felt that the experience-based and common sense approach to identifying source terms was fine for them. But they turned around, went ahead and did the comprehensive assessment thereafter.

So the question that we're raising on this finding is the degree to which, and this is not addressed in 92, the degree to which there is confidence in the source terms that are used as radionuclides of interest in 92 given the fact that there was some question raised on the DuPont era, not the Westinghouse era, the DuPont era by findings such as this.

And we haven't gone any further than that. We're just raising the issue because, again, the finding was it was out of step, it was not a comprehensive characterization, and the fact that Westinghouse turned right around, did a site-wide characterization of all the facilities right afterwards, developed the comprehensive approach which led to the Farrell and Findley assessment.

So the question back to you is are you confident, given those findings, that, in fact, these radionuclides of interest are sound in the 92 evaluation?

Member Lockey: So the question is did the Westinghouse findings, can you apply those to the DuPont area -- DuPont era?

Mr. Fitzgerald: Right, that's that's the finding. Can you do that? And I, I'll leave it at that. And I think you have --

Dr. Taulbee: We will --

Mr. Fitzgerald: -- you have --

Dr. Taulbee: -- respond to the finding.

Mr. Fitzgerald: -- you have broached the question. I know you haven't had a chance to develop the response, but that's our question. Because I think that's a pretty significant finding in 1990 relative to DuPont.

And I think the context of the basis for your radionuclide selection and the samples and frequencies in '81 have a lot of grounding in Farrell and Findley, and the Westinghouse era. That's all we're saying.

Member Lockey: That's a valid, very valid question.

Mr. Fitzgerald: Okay.

Member Ziemer: I have one question just pops into my mind. Is a naval nuclear part of Savannah River, are those folks eligible for the EEOICPA program?

Dr. Taulbee: I don't know the answer.

Mr. Fitzgerald: I don't know the answer to that either, because they reported the naval reactors but they were, they were a tenant at Savannah River.

So I -- they didn't report to the Savannah River office.

Member Ziemer: That's right --

Mr. Calhoun: Certainly the one in Idaho isn't it?

(Laughter.)

Mr. Calhoun: So, I --

(Simultaneous speaking.)

Member Ziemer: In your last bullet point --

Mr. Fitzgerald: I think --

Member Ziemer: -- there doesn't imply that they would necessarily, well, what's the term -- characterize the naval nuclear. The Tiger Team

couldn't have looked at them. They wouldn't have allowed them there.

Mr. Fitzgerald: No, they did. And --

Member Ziemer: They did?

Mr. Fitzgerald: -- I'm not sure why they looked at them but they did because actually, the finding they made was it was the only facility that touched all the bases as far as the source term characterization. So I don't know why they looked, but they must have.

Member Ziemer: Well, okay. That is very unusual. And --

Mr. Fitzgerald: I was wondering about that, but I don't know how they came up with it. That --

Member Ziemer: No, we had -- the Navy had had other sites in DOE facilities and DOE inspectors were never allowed to look at those.

Mr. Fitzgerald: Well, I was wondering if the Admiral might have given a dispensation to have it looked at.

Member Ziemer: He did, he did. And my guess is --

(Simultaneous speaking.)

Member Ziemer: -- he probably -- you recall, Joe, almost every DOE order had an explicit exclusion at the end that said it didn't apply to the nuclear -- or the Navy.

Mr. Fitzgerald: Exactly. This is one of the rare instances where there was actually a finding that addressed the naval facility. I think it was because of the Admiral and the Tiger Team.

Member Ziemer: Yes.

(Simultaneous speaking.)

Mr. Fitzgerald: But, yes.

Anyway, that's the context of that finding and I would expect you would have a response to that.

Dr. Taulbee: We will address that in our response.

Mr. Fitzgerald: All right.

(Simultaneous speaking.)

Mr. Fitzgerald: We're on finding 3 right now, and again, we talked -- we touched on this yesterday, but you know, the original -- the original charge from this Advisory Board was that the initial scope of I think NIOSH's review, and I'm talking about the report '83 review. If you recall, that was the review that was done for 773 for 1981 to 1986, that there was concerns over the scope of that.

And that was before it was even completed that the, that more facilities needed to be addressed, more years needed to be addressed, in order to have a adequate treatment of the question of data completeness for subcontractors.

And so certainly one, one of our findings, and that this was I think advanced in our comments on the sampling plan is our concern that if the availability of permits, job plans, whatever precluded a review of anything but 773 again, and even there for only intermittent years, we just felt it would not provide a representative treatment of the subject of subcontractor data completeness, because you're essentially leaving out a lot of major facilities. And I listed some just off to top.

But, you know, as far as having a, a sense of the question of to what extent job plans generated bioassays, sufficient bioassays for the canyons, tank farms, PuFF, PEF, ETF, RBOF, Uranium Target Fabrication Facility, and all these are -- have substantial worker populations have and particularly the canyons, certainly contamination histories, and a, a number of source terms.

And at the same time, I acknowledge the frustration of the fact that, you know, you have what you have. You know, and what we have is just the records apparently for 773 in terms of permits. So, you have to, you have to use what you have.

But on the other hand, the result is less than satisfactory because the original intent was to expand the scope of, and that was impossible.

So I think this was probably not a surprise finding, and I'm not sure there's going to be disagreement on this, but it certainly has implications for being able to answer the question of representativeness, which I think the guidelines, if you're going to go back to the guidelines, that's an essential attribute of the guidelines.

And at the same time, we went back and took another look at NOCTS because, you know, we wanted to reassure ourselves that NOCTS was more representative of facilities and timeframes.

And I think what we found, and this is something Ron Buchanan did and we'll report on it. Yes, I think NOCTS is more representative, much more representative of a facility in timeframes.

So, this again, focuses on what the scope of the 92 review is. And at any rate, that was our third finding.

Any questions on that? I think we covered --

Member Lockey: So, were there any records were available for 773-A?

Dr. Taulbee: For job plans, yes.

Member Lockey: Is there?

Dr. Taulbee: Yes. They switched from safe work permit methodology to DPSOLs, the DuPont standard operating lists. So, a lot of those tasks that they would be doing, they just initialed off on. And so there's no way to tie those initials back to an

individual person.

And we're only able to find those DPSOLs for a small period of time, as well. They weren't maintained as if you would a rad record these days.

Member Lockey: So, there's 30, as you say, these are for 30-plus facilities that weren't sampled?

Mr. Fitzgerald: Major radiological facilities.

Member Lockey: You have no records?

Dr. Taulbee: Well, yes. But, I mean major radiological facilities here. I take issue with what Joe's saying there. I mean PuFF and PEF, they're all, they're both in 235-F, it's a pretty small building.

Yes, it's a major radiological facility doing a lot of production. We have a lot of contamination records. We know when the construction work was done on that.

So, there's more information than just these, you know, the job plans as --

Member Beach: But can you tie those to any workers?

Dr. Taulbee: Yes and no. We can from external dosimetry for some degree. For construction trades, it gets a lot harder because of they could have been from central shops coming up there.

Member Beach: How about internal?

Dr. Taulbee: For?

Member Beach: Internal?

Dr. Taulbee: For internal --

Member Beach: Yes.

Dr. Taulbee: -- records? General areas, yes. F area, H area, that's how the bioassay was collected.

So, the major areas, like I said, F, H, A, N, each of the reactors we can tie the -- the internal to those areas.

So, through a combination of things, so that's why I take exception of, you know, there's no information whatsoever. There's a lot of other ancillary information. It's not what we had that we were trying to evaluate here.

Member Ziemer: Is there any reason to think that job plans and work permits at the other facilities would be somehow different than what we have for 773?

Mr. Fitzgerald: Who knows?

Member Ziemer: And would have the same shortcomings?

Mr. Fitzgerald: We don't know.

Dr. Taulbee: I have no indication that they would be any different.

Mr. Fitzgerald: No, but we don't know.

Member Ziemer: No, no, I understand that, but --

Mr. Fitzgerald: It's sort of like we can assume, we can speculate, but we don't know.

Member Ziemer: Well, if you assume they did, then you have the same shortcomings.

Mr. Fitzgerald: Well, I'm just saying that --

Dr. Taulbee: Exactly. It's the same shortcoming either way.

Mr. Fitzgerald: -- we, we don't know to what degree they would swing either way. But going back to the comment how major is major, it's like how complete is complete?

You're talking about a pretty big reservation, okay?

Member Ziemer: Oh, yes.

Mr. Fitzgerald: The number of nuclear radiological facilities, and we're focused on a completeness evaluation that only looks at one. So.

Member Lockey: So, what, what percentage is 773-A population wise for that facility?

Mr. Fitzgerald: What would you say?

Dr. Taulbee: Probably 15 percent, 15 to 20. Maybe to a 10 percent type of thing, so.

Mr. Fitzgerald: Ten percent maybe. I don't know. It's somewhere, it's certainly a fraction of the --

(Simultaneous speaking.)

Dr. Taulbee: I mean as Joe mentioned, you know, and not saying I did look at the NOCTS data, and in the '70s we, you know for the graph that I showed yesterday, there's a marked decrease of subcontractor monitoring in the '70s.

But in the '80s its up around 80, 90 percent, which is why I can under the belief that job plan methodology was handled about the same over this time period. Because we're seeing a large number of them being monitored.

So, somehow these subcontractors were making it into the bioassay system.

So, you know, if, whether it is not all of them would be on a routine schedule, some of them who came back frequently would be, sure, so it's working but we don't have the proof that, that Joe's indicating here.

But we don't have evidence that it's not, either.

Mr. Fitzgerald: And we don't have any real evidence of what the completeness would be. Because even though the, the numbers were going up, the degree to which, you know, recognize where

this all came from was this finding in 1997 that they weren't collecting the majority of the job-specific bioassays required by RWP.

So, that's why we're even looking at this issue. And what we're trying to establish is what the completeness.

Dr. Taulbee: I take exception to what you just said there, Joe.

Mr. Fitzgerald: Okay.

Dr. Taulbee: Because you said that, that you weren't leaving the bioassays from the RWPs. A small fraction weren't, about 5 percent of the job-specific bioassay were not being left.

Mr. Fitzgerald: Job specific bioassays.

Dr. Taulbee: And that is why DOE fined the site on a procedural violation. They went back and did a re-sampling. None of those workers had any intakes in that time period.

Mr. Fitzgerald: I would argue --

Dr. Taulbee: Okay, that was done.

Mr. Fitzgerald: Yes, but I would argue --

Dr. Taulbee: And so --

Mr. Fitzgerald: -- that, you know --

Dr. Taulbee: -- you're making the assumption that --

Mr. Fitzgerald: No.

Dr. Taulbee: -- all these people were -- none of them were monitored. It's a smaller fraction.

Mr. Fitzgerald: No, but keep, keep in mind, I, I would have a problem writing this off to a procedural when --

Dr. Taulbee: That wasn't the fine.

Mr. Fitzgerald: No, no.

Dr. Taulbee: It was 10 CRF 30, not at 35.

Mr. Fitzgerald: I hear echoes of Westinghouse. We're looking at a dose reconstruction context here. The question is --

Dr. Taulbee: It is the coworker model.

Mr. Fitzgerald: -- the question is -- yes, the coworker model. We're asking about data sufficiency, and whether or not that data is available to be reflected in the coworker model or not.

And if it's missing, you know, by a large degree, that's an issue. Now, if, you know, the, the question of whether it's missing because of a procedural problem or not, it's missing.

And also, I think the connotation that it was simply a procedural mishap, I think ignores the question of well, why do we do job-specific bioassays when required by radiological work permit?

Well, because you have a unique or specialized issue that requires a prompt bioassay that would look at whether or not, or timely bioassay, looking at whether or not there was intake. You would not do them otherwise.

So, I think it's not just simply a procedural issue, it's something that has some substance to it.

Dr. Taulbee: And yesterday Joe, we went through and looked at all the 1990 to 1998 and we showed that those workers who did not leave samples, violating that procedure, were monitored alongside other -- or other workers working beside them were monitored.

So, from a coworker standpoint in dose reconstruction, they are represented in that coworker model. Therefore, we can do dose

reconstruction.

Mr. Fitzgerald: In 1998?

Member Lockey: I don't think we're talking about that. We're talking about before '90, you know.

Mr. Fitzgerald: We're talking about yes, the '72 to --

Dr. Taulbee: But he brought up in violation again from 1997, so.

Member Lockey: Yes, but --

(Simultaneous speaking.)

Mr. Fitzgerald: No, no, that's, that --

Member Lockey: We're talking about the DuPont era.

Mr. Fitzgerald: I'm talking '72 to '89.

(Simultaneous speaking.)

Mr. Fitzgerald: I don't have an argument with '98.

Member Lockey: You're talking about the DuPont era.

Mr. Fitzgerald: I'm talking about DuPont era.

Member Lockey: Well, he's talking about --

Mr. Fitzgerald: Yes, and the impetus to look backwards is, for that reason that if you have, and you're putting out the numbers of subcontractors for, that were being bioassayed or monitored was going up, I don't disagree with that.

I think that clearly, in the mid-80s and beyond, more subcontractors were coming onsite and -- and particularly by time you got to Westinghouse, the monitoring was done very well.

However, the degree to which that actual job-

specific bioassay was complete is the question that we're trying to weigh.

And I think for the DuPont era, that's not clear because we have a assessment that focuses on one facility maybe 10 percent, who knows, of the radiological workers, and my question on this particular finding is given the fact that the Advisory Board, in the very beginning, found the scope to be wanting in terms of the numbers of facilities, meaning one, and the numbers of years involved, I would question whether that scope has improved that much that the question can be answered very well.

Now, notice I'm not saying that there was an answer, I'm just saying that it's difficult to answer the question with, with one facility over intermittent time periods. We don't even have all the time periods in 773-A.

That's the, that's the finding in three.

So, the question is, you know, while NOCTS may be more representative of the facilities' source terms, there's no argument there, we find that the report in 92 evaluation is not.

And we think it makes a conclusion regarding the Savannah River subcontractor completeness onsite like basis questionable, and that's our finding for number 3.

Dr. Taulbee: Okay, so --

Member Ziemer: Well, you'll have a chance to respond.

Dr. Taulbee: We will be responding, yes. Well, John will be responding.

(Laughter.)

Mr. Fitzgerald: He's using the royal "we".

(Simultaneous speaking.)

(Laughter.)

Member Lockey: So, Tim, the presentation you made to us yesterday regarding 773-A, we can't do for the other facilities because the data's just not there?

Dr. Taulbee: That's correct.

Member Lockey: Okay, that's, I think that's what I need to know.

Dr. Taulbee: That's correct.

Mr. Fitzgerald: Okay, so moving on.

And again, we're still on assumptions and premise.

Finding 4, this is a more specific question and, you know, in the '92 review, and as Tim covered yesterday, they did look at incident-based data, bioassays that were done in the, was it the canyons, Tim?

Dr. Taulbee: It was in F and H areas.

Mr. Fitzgerald: F and H areas.

Dr. Taulbee: It wasn't just the canyons. It was --

Mr. Fitzgerald: Right. Looking at incident data as a source of information as to whether or not bioassays were in fact, linked and performed and addressed the, the nuclides in questions.

And our question here, and it's sort of an open question, but, you know, it's, it's of concern to us, is we looked at these incident reports and we understand the context, and the context is, you know, we, we, you know, certainly NIOSH only had 773-A.

So, you're, you're trying to and I think Tim actually mentioned this, but you're trying to look and see what other sources of information you have that would indicate that, that in this case, DuPont was

performing bioassays as they should.

Dr. Taulbee: On subcontractors.

Mr. Fitzgerald: On subcontractors, and certainly the incident is something you can track a lot easier than job plans, which you can't really track much at all in some cases.

But in the incident review, these involved in a lot of cases that we can find, they involve special bioassays, and special bioassays were incident-driven bioassays. And in the DuPont regime, not to mention Westinghouse regime, that's a whole different kettle of fish.

They had unlike your normal bioassays, the procedures that DuPont actually had for special bioassays were quite explicit. I mean they actually walked down a lot of detail about the documentation, the management responsibility and accountability, and what Health Physics did, what line management did, all these were specified in, in the DuPont procedures.

And it was pretty clear that if there was a incident-driven, or incident involving a potential intake that, under the special bioassay procedures, you know, you would have to respond. You would have to in fact, provide the bioassays, and you would have to do it in a very timely way, and there were a number of responsibilities that were assigned along the process.

So, the question we're raising here is if we're looking at the completeness of the, you know, job-specific bioassays as a consequence of permits, it's almost like this is a non sequitur.

We can't quite figure out, this is useful information but does it really contribute to a understanding of the completeness question?

Can it be used along with, or can it complement the matching process that NIOSH went through to look

at, you know, job plans and looking at whether or not there were job-specific bioassays or not, and taking credit for that.

We think in this case, that given the degree of accountability and explicit responsibilities that we'd be more surprised if they didn't have 100 percent for these. It really didn't give you a whole lot of leeway for not responding. So, it's unclear to us.

Although we understand the value of just having more information, we don't see this as necessarily contributing, per se, to the question of completeness on the job plans as far as job-specific bioassays.

The job-specific bioassays just, just are not the same in our view as the special bioassays that were required under DuPont procedures. That's the essence of our finding here.

Dr. Taulbee: And so maybe we can respond more, but if I could just make a quick comment here.

When we did this, I mean one of the things we were looking at in our mindset and our thought here was if we look at these incidents, and none of these subcontractors we find bioassay for, clearly there's a problem.

But if we find a bioassay for them then, like Joe's saying, is that really answering the completeness? Well, no, but it certainly would have answered it the opposite way if we had not found any bioassay for these people.

That was our mindset in going through this. Okay.

Member Ziemer: And this is pretty much site-wide on these, right?

Dr. Taulbee: We had F and H area.

Mr. Fitzgerald: Yes, this is, this is just one complex, but it's a bigger complex.

Dr. Taulbee: Well, there's, that's most your 30 radiological facilities.

(Simultaneous speaking.)

Mr. Fitzgerald: It's a bigger, it's a bigger complex, yes.

Dr. Taulbee: So, it's.

Co-Chair Anderson: It's where the incidents occurred.

Member Lockey: So, let me see if I -- so DuPont had in place for special incidents, what I'm hearing you say is that they were pretty strict on making sure everything was followed?

Mr. Fitzgerald: Well, even more so, and you know, the procedures -- we find DuPont procedures to be pretty general procedures, more performance-based. You know, they didn't, you know, compared with what Westinghouse came out with later.

Member Lockey: Well, I'm talking about the --

Mr. Fitzgerald: These special bioassay procedures though, were, were, a lot more explicit, more detailed about responsibilities than the other procedures on bioassay.

So, I'm just saying that the distinction when you look at these, these special bioassays, is the level of accountability, responsibility and definition of responsibility. So --

Dr. Taulbee: Identifying the source term, the radiation --

Mr. Fitzgerald: Right.

Dr. Taulbee: -- characterization he was talking about is there.

Mr. Fitzgerald: You had, yes, it was all there, and, you know, it would be wonderful if you actually saw

that for the balance of the bioassay program.

But for special bioassays, they were accorded a level of attention you don't see elsewhere.

So, we're saying that when you look at this, it's, it has to be in the context that this is a much different beast than the other job-specific bioassays.

And if they were, if they came up with percentages that were pretty low, I would be shocked because it doesn't give you a whole lot of leeway. It says you shall do this, this, this and that. You document this, this, and that. So.

Dr. Taulbee: It's not 100 percent.

Mr. Fitzgerald: No, and I was, actually, I was surprised it wasn't 100 percent because actually --

Dr. Taulbee: You can't compel somebody to always leave a bioassay.

Mr. Fitzgerald: Yes. So, in any case, but that's my only -- in terms of apples and oranges, I think again, this is not necessarily the same, and it has implications for how you would address that as far as a question of completeness.

It's useful, it's ancillary, but I, I think our finding is it should be, it should be viewed in the context of not being the same necessarily.

Dr. Taulbee: And I don't dispute that but I would like to point out that that data is also in the coworker model for those subcontractors, and it's typically if they caught in intake, that's going to be some of your higher data.

So, that is already in the coworker model that we are making.

Member Ziemer: And probably the reason management had such explicit detail on this because the potential for higher exposures on these is much greater than the routine models.

Mr. Fitzgerald: Exactly. You have evidence of intake.

Member Ziemer: Right.

Dr. Taulbee: Yes, potential evidence of intake.

Member Ziemer: Right, yes.

Dr. Taulbee: Because not everybody got an intake.

Mr. Fitzgerald: Yes. Okay, so anyway, that's the fourth finding.

The finding 5, which is the last one of this sort of suite of questions on assumptions and basis for '72; again, we're talking '72 to '89.

Returning to an old issue. I mean this issue was raised repeatedly over the last five to ten years. But, I think it's worth revisiting it one more time, okay, because you know, almost all sites when we have destruction of records, it's a significant issue, it's something that the Board and SC&A and NIOSH has examined at some length because it has implications. You know, what records and to what extent and what are the implications of having those missing records.

And for Savannah River, it's pretty clear based on the interviews that when, when DuPont was leaving the site there was a destruction of subcontractor records, the scope of which is not clear. But based on the interviews, and this is a quote from the interview summary, it likely included monitoring records and time cards. That's two examples.

Now, it's not clear, there was no inventory, there was no interview of the people that did the destruction. So, this is kind of anecdotal.

But it was, it was pretty clear that when DuPont was leaving the site as contractor, there were, there were, you know, 38 years they were the operating contractor at Savannah River. When they were leaving, there was a effort to destroy, shred or

whatever, the subcontractor records going out the door.

And as I think Tim's team has attributed, some of the difficulty in finding permit and -- and job plans and what have you for other facilities, it may actually lend itself to the fact that that may have been part of the records that were destroyed.

On top of that, when the Tiger Team came in not too long after that, if you think of DuPont actually ceased being operating contractor at the end of March in 1989 and the Tiger Team was March of 1990, they found many personnel files where radiation dose data are missing for many years.

And did some probing and in addition to, you know, the possible destruction of records, which they did not site but they raised the question of the -- there was a DuPont policy of transferring records to the federal records repository after, you know, two years, I guess it was.

And that it proved to be systemically difficult to retrieve them in any organized way. And this sort of harkens to some of the experience that we've had with the, the repository that it, you know, you can send records to a repository, but trying to retrieve them in a way which makes them useable is a challenge.

And I think in our report we point out that we had something similar at Sandia where, you know, they had a vast amount of records but it was hard to retrieve them in a organized way.

So, that was DOE's finding. I'm not going to -- you know, we did not review that other than we're just saying that that was also something that DOE found back in 1990.

Dr. Taulbee: Again, to comment on that one. And we will be writing a response to this one as -- well, we're writing responses to everything for the Work Group to review.

But, in this particular case, this particular finding of the radiation dose data missing for many years is related to it not being physically onsite. Okay, that was the actual finding within the DOE.

And one thing I'd like to point out and then Paul, you may remember and because early on in this program when we started, we started to request records from the various DOE sites, and initially we started just receiving annual records back, and we started asking and we need the actual dosimetry records.

Each of the sites had to go back and retrieve all of their records from these federal records centers, the actual dose data. They did not retrieve the SWPs or the job plans and all of that information. They retrieved all the internal, all the external data to respond to our claimants.

So, in 2002, 2003 timeframe at Savannah River along with Idaho and all the major sites made these massive requests back from the records centers, that effectively I would say cancels out this particular finding that, that DOE, that the Tiger Team had.

Yes, the missing -- the data was not onsite, that's why they were cited in the Tiger Team. But as a result of our program, these, each of these sites pulled the records back and they catalogued them, Idaho did a phenomenal job with cataloguing but you found that, that one of the things we found with the Idaho cohort was the subcontractors whose temporary badges were not coded, and now they have been coded.

So, that's, that's where this is.

Member Ziemer: But they didn't find these SRS records?

Dr. Taulbee: No, they did.

Member Ziemer: Oh, they did find them?

Dr. Taulbee: Yes, they found them and they're all back there.

Member Ziemer: Oh, they are all back?

Dr. Taulbee: Yes, yes.

Member Ziemer: Okay, got you.

Dr. Taulbee: All the external dosimetry, all the internal dosimetry is back.It's the special work permits, the job plans, the other contamination surveys, air sample data. That they didn't pull back; they haven't pulled it all back.

Mr. Fitzgerald: And I, yes, I don't disagree. I think this is something that we wanted to have a punctuation point on because it's a pretty pithy issue as far as completeness goes.

The question I think I would leave, though, is I'm not sure and I've heard you touch on this. I'm not sure whether we established as part of this process that given the acknowledged destruction of the subcontractor records, that in fact, there's a confidence that, that you have the exposure or the dose records for subcontractors, that you feel that's a complete database.

I mean if the, the --

Dr. Taulbee: I look at NOCTS.

Mr. Fitzgerald: Well, no, that is the claimant file. But, you know, what, what would give you confidence given the, the interview finding that, that these records were destroyed, and may have included monitoring records that, that the monitoring records were probably air sampling and not exposure?

Because I think there was something in there that the exposure records were segregated, so they would not have been available for destruction.

You may be answering this in your response, but I

think that would be useful for the record is to there's no issue with that destruction because as you point out, it was limited, more than likely limited to, you know, air sampling, permits and not the dose records themselves.

Dr. Taulbee: Okay, we will respond.

Mr. Fitzgerald: Because I think that, that really hasn't, I mean I think we've talked about them but it hasn't, I haven't seen it actually addressed per se.

That's the question in finding 5, that we still have this question of, of whether or not key exposure and dose records for subcontractors may have been part of the records destruction that took place.

And you're saying, you're saying that it wasn't.

Dr. Taulbee: Well, we have evidence that it was. I mean, we have ancillary evidence that some records were destroyed from the interviews with workers.

Mr. Fitzgerald: But some records, but not necessarily the key records.

Dr. Taulbee: No. Yes, I mean.

Mr. Fitzgerald: Well, that's, that's a distinction I think would be useful for NIOSH to respond to that in fact, it was the ancillary records, the records that are useful to have as far as surveys like we're doing in 92. But not the essential dose records.

Dr. Taulbee: We have no evidence that those records are missing.

Mr. Fitzgerald: Okay.

Dr. Taulbee: From that time period.

Member Ziemer: All right, keep in mind that many facilities of this type, those records -- duplicates exist in more than one place.

Mr. Fitzgerald: Yes.

Dr. Taulbee: Yes.

Member Ziemer: And it would not be unusual, particularly if they're pulling out to get rid of the duplicates because the originals have been --

Mr. Fitzgerald: Right.

Member Ziemer: -- sent to the repository.

So, it may very well be that some dosimetry records were destroyed. But, I would be very surprised if there weren't duplicates that they didn't need anymore.

There may not be a way to prove that, but.

Dr. Taulbee: I think the claimant response that we did in NOCTS is pretty significant from the, you know, somebody works on the site, you know, we ask them were they monitored, and we go and we get their monitoring records.

Member Ziemer: Yes.

Dr. Taulbee: So, clearly those records weren't destroyed.

Mr. Fitzgerald: Okay. Well, anyway, I think you obviously --

Co-Chair Anderson: You get the work plans? I mean, you don't have the work plans for this period.

Dr. Taulbee: We don't. Well, we have one area.

Co-Chair Anderson: Yes, but do you have any indication that although you got all sorts of other records back from the federal repository that are there, are those records still there? Or are they not there?

Dr. Taulbee: We have --

Co-Chair Anderson: You sort of implied that they sent all this other stuff, but these were not sent implies that they are there. I mean I'm not saying

you want to take two years to get them, but if they're there on an individual basis it might be helpful.

Dr. Taulbee: Not the individual -- well, the individual records, they were sent and they were retrieved back by the site and they're all physically on the site now. And we've been into that records room multiple times.

Some of the other records that were sent away, such as air sampling and contamination surveys, we believe that those were not destroyed either. Because we do see them in the inventory catalogues, so the EDMS system.

Co-Chair Anderson: Okay.

Dr. Taulbee: And so, but in searching for job plans, we can't find them and neither can the records folks. They know they existed at one point, but they're not in their --

Co-Chair Anderson: Yes, got it.

Dr. Taulbee: -- inventory system. That's our indication --

Co-Chair Anderson: So, it's not a --

Dr. Taulbee: -- that they were --

Co-Chair Anderson: Yes.

Dr. Taulbee: -- destroyed.

Co-Chair Anderson: Yes.

Member Ziemer: So, one other comment.

So, most large organizations have rules on what you can destroy, and when. And I would be surprised if dosimetry records were ever destroyed.

Dr. Taulbee: Exactly.

Member Ziemer: Because those, those lifetime

dose record rules went into effect in the '50s. But, it wouldn't surprise me if you had an early destroy date on something like a job plan. By early, I mean --

Dr. Taulbee: Right.

Member Ziemer: -- a decade or two.

Dr. Taulbee: Yes.

Mr. Fitzgerald: Right, and I think with the --

Member Ziemer: But you never found any, any administrative information on how long to keep different records at that site?

Mr. Fitzgerald: No. Well, actually.

Member Ziemer: I mean they would have it for financial records, and they would probably have it for firing records.

Dr. Taulbee: They follow a federal records schedule.

Mr. Fitzgerald: Yes, yes. And I think Westinghouse came up with a very explicit look in response to the Tiger Team, very explicit records policies.

But I think I agree that before that, you had federal requirements. And my sense is that you didn't have radiation dose records, the critical records, destroyed. There were other records destroyed.

But I think given these findings, it would be very helpful just to have a punctuation point on that question before we wrap this up. Because it, these findings from DOE in these interview comments are ones that raise some questions about the subcontractors in particular, and what will happen when DuPont left the site.

I mean just the perspective of DuPont leaving the site and there's a, you know, several days' effort to destroy subcontractor records by numbers of people

with a pickup truck, I think that was the interview, it doesn't -- it's not a good pictorial.

And I think that would be useful closure on that particular item.

Co-Chair Clawson: How about a comfort break? I just saw a lot of submarines in somebody's eyes.

(Laughter.)

Mr. Fitzgerald: Okay, well, that was the five findings, so we'll pick up from here.

Mr. Katz: That's good; it's 10:00 o'clock. Let's take it -- make it 15 because we keep saying 10 and it ends up being 15 anyway.

So, 15 minutes.

(Whereupon, the above-entitled matter went off the record at 9:59 a.m. and resumed at 10:16 a.m.)

Mr. Katz: So, we're back, almost exactly on time. Joe?

Mr. Fitzgerald: Yeah. We're going to expedite this a little bit. The next one is an observation, and I've already touched on this already, about the difference between the Westinghouse and DuPont era, and the cautionary note about trying to -- or not trying to, but inadvertently applying some of the assumptions that are, in fact, valid for Westinghouse, but aren't necessarily valid for DuPont.

Now, I'm not going to go through this in detail. You have it in the slides. One thing I want to point out is that the '88 to '90 is a tremendously big change time period for Savannah River. And I just threw those out -- actually, I left out one, which was the 1987 National Academy review post-Chernobyl.

So, there was a lot of things going on in terms of reviews and changes at Savannah River that ultimately ended up with Westinghouse the new

operating contractor, and a fairly substantial revamp of the management approach and procedural basis for the radiation protection program, and the internal dosimetry program in particular.

So, you know, I think that threshold, that change time period needs to be kept in mind, because it, again, is I think very relevant to the question of how complete are the records and what was happening.

I'm going to stop there, because we really need to get into the other sections of the report which deal with, what I called the earlier, the execution and the results the matching criteria that NIOSH supplied. And I'm going to turn to Bob Barton, who actually did a lot of the -- did the work on the sampling part of this.

Again, this is 1972 to '89. We're still in the DuPont era, so keep that in mind. Bob?

Mr. Barton: Thank you, Joe. Yeah, in this section what we're really talking about is the percentage of the workers who were on job plans and were monitored or not monitored.

And there's really two main metrics here to keep in mind. There's those who were directly monitored, either via --

Mr. Katz: Wait, hold on a sec, Bob. I'm just realizing the phone -- and thank you to all -- the phone is here and you are there.

Mr. Fitzgerald: Do you want to move here?

Mr. Katz: Let's see if I can't -- yeah, why don't we do that actually, if you can.

Mr. Fitzgerald: Yeah.

Mr. Katz: And you can pop right to the laptop, how's that?

(Pause.)

Mr. Barton: Okay, I'll start again. Yeah, this is the section where we're really going to talk about the calculation of the actual percentages.

And there's really two metrics to think about. There's those workers who were directly monitored. They had urinalysis or chest counts associated with that job plan.

And then there's the effectively monitored population, which is a combination of those workers who were directly monitored and those workers who had a coworker. They may not have been directly monitored, but they had a coworker on the job plan who was monitored.

So, again, that's the two metrics: the directly monitored, and the effectively monitored expands upon that to include workers who would be represented by a monitored worker who was on that job plan.

So, when we went in and looked at the data for 1972 to 1989, we made three major adjustments. We removed internal monitoring that was outside of the acceptable timeframe between the end of the job plan and the observed internal monitoring result. And what I mean by "acceptable timeframe" ism if you have a chest count, after two years it's no longer considered a valid measure of the internal exposure. And that even goes for the longer-lived radionuclides.

But, if you have urinalysis results, those can be many, many years down the line and still be a valid result. And for urinalysis for fission products, it's also a two-year cut-off.

So, basically, if you were outside of two years from the end of the job plan -- with the exception of urinalysis for long-lived radionuclides, such as plutonium and americium -- it's really not considered a directly monitored result anymore.

So, that's one thing that we adjusted for.

We also found a couple of instances where coworker matches had been made for two different job plans. In other words, you had an unmonitored worker on Job Plan A and that was matched to a monitored worker on a completely different job plan, so, Job Plan B. So, we adjusted for that.

And the last one concerns this effectively monitored population. We adjusted that to only reflect if the coworker result would actually be used in a coworker model. For example, americium is based on urinalysis results. So, if the coworker actually had an in vivo result, that's not actually used in the coworker model; thus, it's not a representative sample for the unmonitored worker.

So, we're going to start with americium here. And we're just kind of pointing out, again, the limitations of what years we had for analysis. For americium, it was actually just 1973 and the period from 1981 to 1987. So, again, there's no -- we had not job plans for analysis in 1972, '74 to '80, or '88 to '89.

The evaluation does include both urinalysis and in vivo samples for americium, because both are capable of detecting it. But, again, outside of two years, in vivo -- or chest count samples would be more accurate -- are no longer considered a valid monitoring result. Again, outside of two years.

And, again, as I mentioned before, only urinalysis data is used in the coworker model for americium. So, only those monitoring results are relevant when you start to calculate that effectively monitored population.

Dr. Taulbee: Can I ask a question?

Mr. Barton: Sure.

Dr. Taulbee: So, if we had developed a coworker model with the inclusion of both urinalysis and the in vivo counting, would you have considered that,

then, to be included?

Mr. Barton: Yes.

Dr. Taulbee: Okay.

Mr. Barton: So what we're looking at here is a chart, just to kind of show the spread of these various monitoring results in relation to the end of the job plan. On the X axis you have the number of years after the job plan, and we have plotted here in the orange triangles the urinalysis results and the chest counts for americium. And we have the black vertical line there right on the two year mark.

So, as you see, all those blue circles to the right of that line would no longer be considered relevant to this study because they're outside of that two-year cut-off.

Again, only for chest counts. All those orange triangles count even though they could be, as you see here, five, six years down the line from the end of the actual job plan.

So, this brings us to observations 2 and 3, and I'll read these in. Observation 2: during the 1972 to 1974 period, RPRT-92 only evaluates one job plan/worker combination, and that was Job Plan No. 46, for potential americium exposure.

However, we noticed that in Attachment D to RPRT-92, it actually indicates there is one other job plan, Job Plan No. 47, that required americium monitoring. However, evaluation of that job plan showed the workers involved in that weren't monitored either. So we're just pointing out that RPRT-92 shows there was only one job plan to evaluate. It actually might have been two, but the result is the same: those workers weren't monitored.

Observation 3: only 13 percent of the subcontractor job plan combinations, and there were 17 total, had americium urinalysis performed that could be

considered relevant to coworker modeling.

Eleven of the 17 urinalysis data points represented incident-driven monitoring that were actually outside of the period of interest and in a different area.

On to findings 6 and 7. And, again, we're talking about americium here.

For the period 1980 to 1989, only 20 percent of the identified subcontractor job plan combinations identified by NIOSH as requiring americium sampling had internal monitoring performed within the acceptable timeframe. So, again, that's chest counts within two years but a urinalysis result pretty much anywhere down the line. So, 20 percent were directly monitored when making those adjustments for that two-year cut-off point.

Finding 7, and this is regarding the effectively monitored population. So, this is when you add in if the unmonitored worker had a monitored coworker on the same job plan.

So finding 7 is the total effectively monitored population for americium -- again, those monitored directly or have a coworker on the same job plan with a urinalysis result during the 1980 to 1989 period -- is approximately 33 percent.

So that's the 20 percent that were directly monitored, and, on top of that, there's another 13 percent that we can match to a coworker who had a urinalysis result.

Moving on to finding 9, you'll notice these are slightly out of sequence, and that's just because we're talking about americium in this section.

Finding 9: SC&A does not find that the data collected as part of RPRT-92 support the premise that subcontractors on job plans that should have required internal monitoring for americium were either directly monitored -- again, around 20

percent -- or alternately represented in the derived coworker models for SRS, around 13 percent. So, again, that gets us to the effectively monitored percentage of just 33.

Monitoring of fission products. SC&A's monitored total is about 70 percent and it really closely matches NIOSH's, which was 74 percent. And the difference is really, again, due to the removal of those samples that were greater than two years after the end of the job plan. And, again, this goes to what data is actually used in the coworker model. All the fission product monitoring identified for this earlier period, '72 to '74, is based on urinalysis, not in vivo. The coworker model is based on in vivo.

So, again, the effectively monitored population really remains unchanged because, even though people on the same job plan might have been monitored, it was via urinalysis. The coworker model is based on in vivo. And that's so the 70 percent effectively monitored can be compared to the RPRT-92 reported total, which was actually 94 percent.

Moving on to the '80 to '89 period, SC&A again were about 73 percent and the RPRT-92 total was at 78 percent. The difference here is, again, removal of those entries that were greater than two years.

And a few of the entries we just couldn't verify. A couple of them we couldn't find the actual source dosimetry file, and the remaining one, when we found it in the dosimetry file, we couldn't find the actual sample in that file.

And, again, the majority of these fission product monitoring is based on urinalysis, not in vivo, so the effectively monitored population in this case only marginally increased to 74 percent. And that can be compared to the 99 percent, which was reported in RPRT-92.

So, this is basically that finding, that many of the workers, around 70 to 73 percent, who should have

been monitored for fission products underwent the appropriate internal sampling. And this is for the entire period prior to 1990, and this is fission products.

But, again, very few of these monitored workers underwent in vivo counting. Thus, they are not included in the coworker model and can't be considered as representative to the unmonitored worker.

And this sort of brings us into the Westinghouse era, which is Ron Buchanan's domain.

Co-Chair Anderson: Just --

Mr. Barton: Yes, I'm sorry.

Co-Chair Anderson: This was still only Area A?

Mr. Barton: Yes.

Co-Chair Anderson: Okay.

Mr. Barton: Yes. Oh, one more thing. You will notice there's no slides here for plutonium. That's because our numbers pretty much exactly matched what NIOSH presented. So, really no point.

Dr. Taulbee: One thing I would like to point out about the americium -- and this is important, in my opinion -- is that americium, in most of the areas, based upon the Farrell and Findley document, is tied with where the areas where it's now required, whereas before it wasn't necessarily required, was due to the ingrowth of americium and aged plutonium as it grows.

However, Savannah River, unlike many other sites, most other sites, actually did americium separation, okay, where they purified it, where they made it ultra-pure so plutonium isn't the tied in. Where that took place was in three areas onsite, two of them were in A Area, that we've been kind of focusing on and we only have there. There's only one other facility, the F Area, where americium exists by itself

without being tied to plutonium.

Member Ziemer: Bob, I have a question on finding 6 that it may be that I'm not understanding the wording, but it appears to say that americium sampling was required in the job plan. Twenty percent of the subcontractor job plan combinations identified by NIOSH as requiring americium sampling.

Mr. Barton: As identified by NIOSH as requiring americium sampling.

Member Ziemer: Oh, okay. I thought you were saying the job --

(Simultaneous speaking.)

Dr. Taulbee: No, not in the plan.

(Simultaneous speaking.)

Member Ziemer: Okay, I thought you said the job plan combinations that you identified -- the job plans didn't require it?

Dr. Taulbee: No, we made the assumption that if they wore a respirator it would be required under a modern standard.

Member Ziemer: Okay, yeah.

Mr. Barton: And these were also job plans that were in a specific area of --

Member Ziemer: No, no --

(Simultaneous speaking.)

Member Ziemer: I think someone could interpret that as saying that the job plan was requiring it. It should say that combinations -- well, okay. NIOSH said it should be required.

Mr. Barton: That's right.

Member Ziemer: The job plan.

Mr. Barton: Yes. Right.

Member Ziemer: Okay.

Mr. Barton: Okay, was there any other questions?

Ron Buchanan, you have the phone if you want to take over for the Westinghouse era, 1990 to 1998.

Dr. Buchanan: Yeah, this is Ron. We've been talking about the lack of representation of areas in the earlier period, and so what I wanted to do was look at the 1990 to 1998 period and see did the RWPs -- and we'd also previously done this with the NOCTS data -- cover the different areas, or was it limited to mostly Area A, as we've seen on the issues there in the past.

And so I looked at the RWP data and I found that it was representative of several major areas, A, E, F, H, M and G, for the period '91 to '98. Now, however, it did bring out the fact that there was only one RWP for 1990, which was for Area F, and there was no monitored subcontractor trade workers in that RWP.

And so the next slide, please.

Okay, so, this led us to finding 10, that the data for 1990 is lacking. That 1990 should be included with the period of limited data of '72 to '89, and not bundled in with the year '91, because in RPRT-92, they include '90 and '91 as bundled together.

However, there was corporate changes taking place, as we've discussed earlier. However, we've seen it took a while for this to take effect, that in 1990 there was only one RWP and we're considering RWPs in '92. And so not necessarily claimant data, but RWPs.

And so, in SC&A's estimate, 1990 should not be bundled with 1991, but should be treated with the earlier era. And so that would break the time period up into '72 through '90, and '91 through '98,

so that 1990 is considered an era with very limited data.

Okay, next slide, please.

Okay, now, this has been kind of a touchy subject in should you require that all radionuclides that are listed on an RWP, or assume to be required. Now, as we've seen, there's a problem in listing the radionuclide on either a job plan or RWP or whatever it is. And in RPRT-90, NIOSH assumes, according to the respirator requirement or the requirements that were listed sometimes later in the '90s, the radionuclides listed on the RWP, were they monitored for?

And so, say that you had plutonium, uranium, and strontium was supposed to be monitored on a RWP according to the documentation. And the sub was monitored for strontium but not monitored for uranium or plutonium. And so what I understood NIOSH to say is that, well, they would count that as a score that the sub was monitored according to that RWP if he is just monitored for just strontium, because a coworker could be assigned for the others.

We disagree. We say that if the RWP requires three radionuclides, then there should be three radionuclides monitored either by spatial bioassay, by routine bioassay, something in the records in a reasonable amount of time that Bob just alluded to, to be counted, to fulfill the RWP requirement. Because if you can assign coworker dose for plutonium and uranium because he had a strontium bioassay, what if he didn't have a strontium? You can assign a coworker there and count it as a score, too.

So, I don't see that they're related, if you have one, why that allows you to assign coworker to the other. I think that all three should be required.

So, say that you do assume that requirement, that all the listed radionuclides either on the RWP or

recommended by NIOSH according to that particular area and time.

So, we went through it and we sorted this out and we said that the directly monitored -- that's one where the sub actually left a bioassay -- it would range from 47 to 77 percent compared to 76 to 96 percent listed in RPRT-92, because you're not accounting for as many scores as you do if you only have one of the on or more radionuclides required. And if you extend this to the coworker and the effective monitoring, then we get a range of 55 to 89 percent, compared to 85 to 99 percent reported in RPRT-92. This difference is particularly noticeable, of course, in the earlier pre-1990 eras.

So, if you look at the next slide, it summarizes this in a table received for the different periods. And you've got directly monitored according to RPRT-92, and then SC&A's calculation where you had to have all the required bioassays. And then we have the effective and then, again, SC&A's calculation.

See, in the early years it drops substantially from 76 percent down to 47 percent for the directly monitored, and the effective monitored drops from 85 to 55 percent, and then, of course, no data for part of '70s.

And then, in the '80s, it drops from 90 percent to 51 percent, and 99 percent to 66 percent. And for the '90s, then, it doesn't drop as much, but it still drops some, from 96 to 77 percent, and 97 to 89 percent.

So, what we wanted to illustrate here by this summary table and our exercise that we performed, was that if you consider all the radionuclides being required that's listed, then you don't have as large percentage as RPRT-92 shows. And so that is what the purpose of this exercise was.

Okay, next slide. Okay.

And so this brings us to, again, this coworker issue. I have some issues with saying a person is

monitored because he worked beside somebody else. And so I wanted to look at was this coworker criteria actually applied strictly?

I think that if a person is directly monitored, you know that. However, if he's working with someone, then there are some criteria that has to be applied to say that his intake would simulate the unmonitored worker's. And so we looked at the data in RPRT-92 and we used their criteria of what radionuclides should be monitored for, and such as that. And we looked at the unmonitored worker vs. the assigned coworker that was monitored, and they was on the same RWP 96 percent of the time. Okay, so 4 percent of the time they used a coworker from a different RWP.

Unmonitored worker compared to the monitored worker had the same job title 60 percent of the time. Now, I know that in the previous talk I believe NIOSH said that they did not consider that the crafts necessarily have to be the same. And in some cases, that might be true, but I think, in a lot of cases, you don't know that, and so that is important that the craft be the same. Because, with a glove box, if you've got a electrician working on a glove box and then you've got a pipefitter coming in and working on a glove box, that might be true. They're exposed to similar situations.

However, in a facility, if you've a plumber working on a sump pump and you've got a electrician working on the case, the wiring in the case, on the same RWP at the same time, same date, their exposure potential is quite a bit different. And so we looked at the craft title -- or job title also.

Dr. Taulbee: Can I ask you a question there, Ron?

Dr. Buchanan: Yeah.

Dr. Taulbee: Did you go through and look at the actual work that was being conducted, the tasks on that RWP where we were doing those matches? And did you see a significant difference of people in

that latter example that you just indicated?

Dr. Buchanan: No. We went by what was given in the appendix of RPRT-92 whether the craft title was the same. Because if you go back through all the -- we assumed that you went back through all the records when you matched them up. But if the craft titles weren't the same, then we didn't count it as a match. So, the answer is no.

Dr. Taulbee: Okay.

Member Lockey: Jim Lockey. I'm not sure what -- I'm not sure what you were trying to do here. You were assuming that the craft title should be the same?

Dr. Buchanan: Yes.

Member Lockey: Why?

Co-Chair Clawson: They should be doing similar work.

Dr. Buchanan: Because --

Member Lockey: I don't know, if you're in the construction job trades you can have a plumber, electrician, and carpenter all doing the same work -- different work within that job title. That doesn't make sense to me.

Co-Chair Clawson: No. That's not true. You go into a glove box, you have an electrician that's going to take and disconnect electricity, he's going to be in there for a matter of minutes to be able to disconnect it. Then you have a pipefitter or a mechanic that's going to be pulling out the glass, changing the boots. He may be there three to four hours. You can't do that.

Member Lockey: No, I know.

Co-Chair Clawson: Anybody that's worked in --

Member Lockey: They're different job titles.

Co-Chair Clawson: They're totally different, but they're going to be on the same -- being able to say that, well, they're doing the same, they're going to get the same, no, that's --

Member Lockey: Well, what I see here is 60 percent of the time whether they were the same. Is that a reasonable figure? Sixty percent of the time, is that a reasonable figure, Brad? Is it 40 percent, is it 20 percent? Is it 80 percent?

Co-Chair Clawson: Honestly, I don't think you can ever do that, to tell you the truth. I have a hard time with the coworker and --

Member Lockey: I know, but when you're looking at trades that are coming and doing specific subcontract work, I mean, are we going to say that unless you have 100 percent that they had to be the same trade? That doesn't fit the job process being done. It just doesn't work.

Co-Chair Clawson: They need to be doing the same thing. Let's take, you bring in a pipefitter now, a pipefitter/boilermaker, they weld. Is there going to be any difference between that and electrician? Substantially --

Member Lockey: Now, we're talking about the title of the trade person, that's all we're talking about. I mean, this was matched on that they had the same title, as I saw.

Dr. Taulbee: Right, and the example that I gave yesterday was four people doing the same work of all deconning inside a hut, deconning the V2 riser. Okay, that's a case where I assume they would find there isn't a match, therefore, they weren't doing the same work. And I'm saying on the RWP, it says what they were doing. The description.

And I'm asking did Ron evaluate those descriptions, and he didn't. He indicated that. And I'm not sure that we went through in that level of detail. But we're on two different sides here. We've got to

match the job title or be in there at the same time. And I think perhaps the appropriate one was were they doing the same work, or the same type of work, in the same exposure environment? And it's not one or the other, is the point.

Mr. Fitzgerald: It's not like you need the exposure environment because as --

Dr. Taulbee: That's what we were --

Mr. Fitzgerald: -- I think Ron was pointing out, the function of the trade or the type of activity, you would have a exposure potential of being higher or lower.

And that seems to be the question, right?

Member Lockey: Oh, I would agree with that. The plumber may be different than a carpenter.

Mr. Fitzgerald: Which would be difficult because, you know, but an electrician that had difficulty would be there longer. I mean I don't know how you --

(Simultaneous speaking.)

Member Ziemer: Well, the unmonitored worker is going to be assigned a number that's based on the model, and virtually is never going to match the actual data of the workers.

Mr. Fitzgerald: Yes.

Member Ziemer: It's almost always going to be substantially higher.

Co-Chair Anderson: Which was included in the model.

Mr. Fitzgerald: Right.

Member Ziemer: And that's why the model is used because it's, it's almost an upper -- well, if they're, if they're both working the same site, he's going to

get the 95th value.

So, it's going to be substantially higher. Because you can't really account for what you're describing here on such a granular basis for every coworker.

Mr. Barton: Let me just clarify something here though.

So, during the DuPont analysis, SC&A did not make any adjustments based on job title. The only adjustments made on coworker matches was if they were actually on different job plans.

So, you know, on slide 16 when we report that only 20 percent were directly monitored, we didn't make any adjustments if NIOSH had made a match between a coworker and an electrician.

We do note it in the report, but in these totals, there's no adjustment for that.

Mr. Fitzgerald: Okay.

Co-Chair Clawson: So, this is just flat out --

Mr. Fitzgerald: Sixty percent of the --

Mr. Barton: That's the earlier careers.

Mr. Katz: Earlier careers, not the careers Ron Buchanan's discussing right now.

Dr. Taulbee: Okay, but in the, in the current one, 60 percent of the time they're on the same job title. The example I gave yesterday showed four people doing the same work, two laborers, a sheet metal and a carpenter. We counted them as the same. SC&A would not be counting them in this case.

Co-Chair Clawson: Correct.

Dr. Taulbee: That's the difference.

Mr. Barton: Okay, understood.

Mr. Fitzgerald: Would the clarification notes and

your responding to our review, would the clarification be to show, you know, how this would play out as far as if you look at the activity vs. the job title, or is that too, maybe too complex?

Dr. Taulbee: Well, it would be, it's going to be very complex --

Mr. Fitzgerald: Yes, I was going to say --

Dr. Taulbee: -- to do, and there's going to be fully a position of judgment --

(Simultaneous speaking.)

Mr. Fitzgerald: -- when you pull back the cost comment, it may not be answerable anyway.

Dr. Taulbee: But it's yes, so it's not --

Member Ziemer: That's why you have the coworker model.

Dr. Taulbee: Yes, sir.

Dr. Buchanan: Okay, can I make a clarification here?

Mr. Katz: Wait, one sec Ron.

Co-Chair Clawson: Wait a sec.

Mr. Katz: Brad wanted to say something.

Co-Chair Clawson: You're building a model and what's this model chosen for? It is to give unmonitored workers' dose. Ninety-five percentile, correct? Ninety-five percent of nothing is still nothing and you get into that.

You think about the petitioner looking at this, the people that are actually in these hot cells, actually doing this work. And by the way, when you put a different person in there that's -- you're not, you're not going to stay in there. You get in there, you get your job done, you get out.

And so you're taking those type of doses given to somebody that's over there doing a similar job. I see some problems with it. But, you know, I understand that we've got to try to figure out some way to be able to give the unmonitored workers a dose. But it's --

Member Lockey: It's not perfect, Brad, that's for sure.

Co-Chair Clawson: It what?

Member Lockey: It's not perfect, that's for sure

Co-Chair Clawson: It's not perfect but I think it's my personal opinion is that it's way off.

Just working in the industry that way, it's, it's just little hard for me to swallow.

Go ahead.

Dr. Taulbee: Go ahead, Ron.

Dr. Buchanan: Okay. Well, what I want to clarify is that when NIOSH here in RPRT-92, when they are matching a coworker to an unmonitored sub, they are not talking about the coworker model 95th percentile, 50th or anything. All they're doing is trying to determine whether that sub was monitored or not.

If he was monitored, that's a score. If he worked with a, a given person on that job, that is a score, too, a monitored coworker.

That coworker is different than the coworker model you're developing. All we're using is to see if it scored or not.

And so we're not saying this unmonitored worker is going to receive 95 percent of the tables in a book, we're saying is he monitored or not?

And, that's actual monitored himself or effectively monitored because somebody was working with him

which would represent him being bioassayed.

So, coworker here is different than the coworker model in a table. And, so I just want to clarify that because some of these discussions, it seemed like those were being mixed.

Okay, so anyway, regards to the person's view on what, what constitutes a similar exposure in, in a coworker. If you use the job title as a guide, we find that 60 percent were signed in on the same RWP.

And, then the next issue were they same in same time -- same date? And, that was on the RWP and that was 77 percent of the time that the coworker and unmonitored worker were signed in on the same RWP.

So, the next slide -- yes?

Dr. Taulbee: Just a clarification point on this. By same date and time, how were you determining the time from that standpoint? Did it have to be exact sign in?

Dr. Buchanan: Well, no, it mainly was it --

Dr. Taulbee: Time is --

Dr. Buchanan: -- they signed in in time like intervals, like 11:00 o'clock -- 10:00 o'clock to 11:00 o'clock in the morning. Or, was one signed in in the morning and one signed in the afternoon? Or, one signed in at 9:00 o'clock and left at 10 and the other one signed in at 12 and left at 1.

The half overlap. Was there overlap in a similar time period? Now, because if one was in there --

Dr. Taulbee: Okay.

Dr. Buchanan: -- for an hour and the monitored worker was in there an hour and the unmonitored worker was in there for two hours, then I can't see that you say that the unmonitored worker was

represented by the monitored worker because he, he would get twice the exposure. So, similar time periods.

Dr. Taulbee: Okay. Just wanted clarification on that. Didn't quite follow that in the discussion of what you were defining as that.

Dr. Buchanan: Okay. Okay, next slide.

Okay, and so okay, this, this is really the next bullet point here. They were both signed in on same time interval roughly. I mean it takes time to, to suit up and unsuit and stuff, but roughly at the same time to represent similar intakes.

Okay, and so if we -- you went through and you went through those four criteria, RWP, date, similar time intervals and same craft, we see that at 45 percent of the time, that indicated that they were actually in the same time doing similar work side-by-side for the same period.

And, so what, what I wanted to bring forth here is that I, I feel like Brad does that this use of a coworker is kind of iffy, and if we are going to use it, then we have to be fairly strict on how we use it. And, so this was what this purpose of this exercise was for.

So, the coworker used in R-92 is somewhat I would say in some cases, would be questionable.

Okay, next slide.

Okay, and so now we talked about the change in operating companies, change in DOE's regulations and everything, and that we've seen that of course, the additional data that's been obtained recently, and all, and all the boxes has helped the case with the 1990s.

However, I don't want to be under the delusion that this solves all of our problems come, you know, January 1, 1990. Because it's a large, very large

facility, very ingrained habits, and so it took a while to implement all of this.

Not 1990s, early 1990s was not free of their data issues. And, we've seen that it wasn't a step function as we see in the 1990 it only has one RWP that we could find. And, so, and that's the reason I recommend be included with earlier years.

And, to look at this in some quantitative detail, I looked at the RWPs and seen when they started requiring specific radionuclides. This is one of the contentions in the earlier years was that the radionuclides weren't specified and in the '90s also. Excuse me.

And, so I looked and seen how this progressed as the 1990s went on and you see there at the first bullet point, we see that the plutonium requirements listed on the RWP either increased from 4 percent in '93.

So, '90, '91, '92 wasn't any, and then '93 is 4 percent. And, then see we see '94 it was 78 percent, and in '95 it was 100 percent.

So, apparently, you know, they got into the flow of things in about the mid-1995. Looked at strontium and fission products, similar case. Zero '93, 92 percent in '94, and 100 percent in '95.

So, this exercise was mainly to illustrate that while the 1990s did see improvement that there was -- it took a while for it to be implemented, and this was the purpose of this exercise.

Okay, I think that's the last of my slides. Any questions on them so far?

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

Mr. Fitzgerald: Okay, thank you, Ron.

What I'm going to do is, is more or less these aren't findings or observations, just perspective for the Working Group and, and NIOSH.

And, we did take a look at RPRT-94. We don't have any response to 94, but there were some interesting perspectives and I found it pretty valuable review of the, I think it's mostly the DuPont era. I think it was '72 to '89 or something like that.

Dr. Taulbee: That one's going to get added. We'd already done the Westinghouse.

Mr. Fitzgerald: Right. And, but it addressed the subject of, yes, the time span between employment and bioassay, and we kind of touched on that several times the last couple of days.

And, and I guess my only issue there, and I hope that Tim will address that in his response, is that it, it sort of represents as we discussed, sort of a very fungible issue depending on what you count, and what is considered a missed monitoring or not.

And, you know, there's been, I know initially, in 2017 we were using a year or the normal preschedule cycle as, you know, as capturing it. Now, we're seeing maybe three years, I think three years was cited in '94.

But, you know, as '94 points out, the fraction of monitored subcontractors would increase for each year that you increase that span.

So, it's, it's certainly a question that does influence, you know, the matching percentages not only in '92 but maybe even as a measure of completeness in the future.

So, that would be useful as, you know, to tie together I think some of the thinking that's been going on for a year or two or three on the question of, you know, how does one actually gauge what's monitored and what's not monitored in terms of completeness as a function of that time period.

And, you know, a lot of what we did in adjustments is to simply taking a different perspective on that.

And, I think that's sort of a fluid area. So, I would invite that review and some consideration on that.

And, I don't think we're saying this is wrong, this is right, but we're saying you can take a different perspective depending on what the adjustments are on that.

The second question, and I want to raise this because we've gone through some discussion about, you know, how solid the SRS monitoring program is, and, you know, the Defense in Depth.

I have no issue with the soundness of the radiation protection program, the monitoring program. And, we're very explicitly focusing on the question of job-specific bioassay follow up, and whether that, those records are complete enough to support a coworker model period.

And, I just want to make that clear because we spent a lot of time trying to, to address the completeness, the soundness and the availability of data.

And, I don't think there's any, any debate on that as it pertains to the routine, overall program. So, I just wanted to make sure that that was clear.

The next one we talked about yesterday, which I think is a very, very important question for the Board in particular, but, you know, how complete is complete?

We've hit that a number of times and yesterday, we actually kind of broached that subject. You know, well, if it's, you know, if 80 percent's not demonstratively complete, what would be complete, and I think Tim was allowing that, you know, in his view 50 percent, you know, in this context and in this particular consideration, would be a threshold.

But, and there was an asterisk, that could be lower depending on the circumstances, as I recall.

I think this is an important question because I, you know, going back over time, and I have to admit I guess some of us have been in the program a long, long time. We used to get concerned -- I remember in an earlier SEC discussion back 10 years ago, we were concerned about 10 percent incompleteness as I recall.

I think Paul, you were chairing back in those days. I mean I forget what site it was and I tried to look it up, I couldn't find it. But, we were concerned about 10 percent data incompleteness and spent a great deal of time trying to chase that down and determine whether that was significant or not.

Now, we're in the realm of 50 percent and in this particular discussion, and even lower as, as I think Tim pointed out in terms of the circumstances.

So, since EEOICPA, the large part of the origins of the Act was based on the incompleteness of records in DOE, and the fact that it would be difficult in some cases to reconstruct because those records are missing, that was certainly a contributing basis for the SEC process.

And, you know, this question of completeness and how complete is complete, and to what extent does one address that, I think is a very, very important question.

And, really if the context is how representative is the data, then if you only have a third to 50 percent of that data, is that sufficient to give you a representative dose distribution to come up with a bounding, or a bounding estimate or not?

And, going back over the guidelines, I think the 2015 guidelines are very explicit on that subject.

And, you know, I just want to for the record, just stress that coworker datasets should be established for monitored workers with comparable activities and relationships to duration of environment.

To accomplish this, one must carefully evaluate each coworker dataset to ensure that it's either representative of the distribution of exposures for the intended population, or that it provides a plausible upper bound for those workers.

So, you need enough data to come to that conclusion. And, I don't, you know, I don't know what the, you know, and the answer may be relative to the circumstance. But, certainly 50 percent or less gives me pause.

And, I think that, that I would lead that issue and it's a policy consideration on both sides, and so I don't want to go any further than that.

But, certainly at least we have spent some time talking about percentages of matches, what's enough, and I think that comes down to is that fundamental question: what is representative, and how much data does it take to give you that, that basis?

Dr. Taulbee: I would just like to, to add to what, what you're saying there but add a word of caution here in the percentages that are reported in RPRT-92. Because these are for subcontractors, okay?

Our coworker model went with all construction trades, both DuPont and subcontractor. And, so to use the example of yesterday of the americium where in the 1980 time period, our number showed that only 34 percent were directly monitored. In that particular case, I'm using round numbers here, 30 percent not monitored, 30 percent we were able to match, and 30 percent were unmonitored.

That's in the context of just the subcontractor workers. If you add in our, what we can discern from the job plans, that subcontractor work made up about 15 percent of the total construction work.

So, if you go through the actual numbers here of 100 workers, and I'm rounding here, is 85 would be DuPont construction, 15 would be subcontractor.

Of those 15 subcontractors, 5 were directly monitored, 5 we can place with those directly monitored subcontractors, and the other 5 we declared as unmonitored at this time and not having a match.

But, we didn't go and look and see if there was a DuPont construction trades worker with them, or anything along that. We were only matching against subcontractors.

So, what we effectively have here is 90 percent monitored, 10 percent not monitored, 5 of that 10 percent we know is represented by that 90 percent.

So, that's a case of, I agree with what Joe is saying that, you know, anything below 50 percent causes us some pause. But, it needs to be taken into the broader context of what the coworker model is doing, and how we are taking that data in the end and applying it.

Mr. Fitzgerald: And, I, you know, associate myself with that comment.

(Laughter.)

Mr. Fitzgerald: Sorry about that.

Anyway, but, you know, on Section 2.2 on data completeness, I'm going to go back to the guidelines because I think this is really an important consideration.

It says the amount of available monitoring data must be evaluated to determine if there are sufficient measurements to ensure that the data are either bounding or representative of the exposed potential for each job or exposure category at the facility.

So, when we're looking at subcontractors, I guess I would ask you is that a job or exposure category that deserves the attention from the standpoint of the exposure potential, that in other words, does

the data represent the exposure potential for that group or not?

So, even if you meld it into the larger CTWs, you, and this gets back to the stratification issue, are they distinct populations or not? If they're not, then I think the data completeness issue is a different, maybe a different issue.

And, we're kind of grappling with both questions. Are they distinct populations, and is the data complete, but they're actually related from that standpoint.

So, we haven't gotten into our exchange on stratification but I think that's still an open question.

So, I just want to make sure, and these are all station identification issues. I mean we don't have a finding, they're still unprocessed, but I think that's an important if not a determinative, consideration that certainly the Work Group will need to be mindful of.

Mr. Calhoun: And, I think it's really important that to keep our eyes on, you know, we talk about the bounding. There would have to be some indication that people from any population would have exceeded the dose that we would assign with the coworker data.

So, if, if there, if our coworker model is such that it encompasses everybody, I mean we almost have to work from it in the other direction that, you know, I need some indication that there was a population or a person that exceeded the dose that would be assigned in a coworker study.

And, it doesn't seem like that right now because it seems like most of the highest exposed people are included in that study, and it would be a bounding dose assigned. To me.

Member Lockey: Is your exposure data pretty homogeneous?

Dr. Taulbee: It's mostly non-detect.

Member Lockey: So, we have homogeneous exposure data across the whole population. Was there any indication that there's undocumented excursions above that? Or where there is incidence data that doesn't fall within their realm?

Dr. Taulbee: No. I mean whenever most of the high data are, are from incidents that were caught in the workplace, and sent for special bioassay, and, and that's --

Member Lockey: Are they included in the --

Dr. Taulbee: In the coworker? Yes, they are.

Member Lockey: And, they're bounded by that?

Dr. Taulbee: Uh-huh.

Mr. Barton: If I might make a comment here though, that the whole purpose of this exercise was to establish representativeness. You know, if this particularly for workers is not represented sufficiently in the coworker model, you can't really make a determination whether that coworker model bounds that group or not.

Member Lockey: No, but if you have, if you have incident protocols in place, that's going to apply to everybody.

Dr. Taulbee: Yes.

Member Lockey: Okay? And, that's worst case situation.

Mr. Barton: But again, we're trying to figure out if this coworker model can apply to the unmonitored worker.

I mean if there's a group of unmonitored workers out there, those that were supposed to be monitored by job plans, and they're not sufficiently represented in that coworker model, I'm not sure

how we can make the determination that it's bounded.

Mr. Calhoun: There'd have to be some indication that they were higher exposed than the bounding dose of the coworker.

Mr. Barton: Well but how would you know --

Mr. Calhoun: That's the only --

Mr. Barton: -- if they were or not?

Mr. Calhoun: Well, you're making, you're jumping to a conclusion that you have super high exposed people that weren't monitored.

Dr. Taulbee: There's no contamination control, there's no airborne samples, nothing --

(Simultaneous speaking.)

Mr. Calhoun: But we need an indication of that. We can't just have a gut feeling that that happened.

Member Lockey: And, that's what, that's what I was asking. How, if the data was very heterogeneous, so in other words, it was all over the place and we had data points that we don't know where they came from and what job title was associated with it, and they are five standard deviations away from what we would expect, then that's a whole different ballpark.

Member Ziemer: Well, they're really just asking the question. I think NIOSH has the burden to show that what they are using for the model does, in fact, improve it.

(Simultaneous speaking.)

Member Ziemer: So, it's a valid question, they need an answer.

Mr. Fitzgerald: And, I actually think that what Grady was saying is true. That for the DuPont era,

you know, one needs to demonstrate that in fact, the management and administrative procedures or what have you, would have done that or not.

Member Ziemer: Yes.

Mr. Fitzgerald: You would have, would have prevented or precluded those exposures because you do have the firm linkage and the very definitive procedures and follow up you have in the Westinghouse era. But you don't see that so much in the DuPont era, which I think the questions we're raising is without having that kind of information, what are you left with?

Well, I think what you need to do then as a compensatory approach is to demonstrate that okay, you don't have one for one as you might have in the Westinghouse era that gives you confidence that in fact, those intakes would have been precluded because of the program they have in place.

DuPont's more general. They don't have definitive, you know, requirements for jobs with bioassays, et cetera. You have to make a lot of assumptions.

Can you provide the kind of assurance I think that we're talking about that you wouldn't have those higher exposures amongst the subcontractors in DuPont time period or not.

I mean I think with the results that we're seeing, it certainly doesn't, doesn't answer the question that the representativeness isn't going to get you there, so what else can get you there?

The only thing I can think is if maybe along the lines we're talking about is compensatory, can you actually show that DuPont managed this thing in a way that you would not have -- you would see any intakes or exposures that would have been above and beyond the coworker model for subcontractors.

I mean I don't think, you know, to me, we can't get

there with the data we have from the DuPont era at this point. So, what do you do when you can't?

You know, I'm looking at the guidelines and saying the guidelines say you need to evaluate the data and, and demonstrate it's representative and can be --

Dr. Taulbee: Or bounding.

Mr. Fitzgerald: Huh?

Dr. Taulbee: Representative or bounding. There's a hierarchy in there that's listed.

Mr. Fitzgerald: Right.

And, I think if it's not representative, that --

(Simultaneous speaking.)

Mr. Fitzgerald: You have to show that in fact, there's nothing that would go above your bounding dose.

Member Ziemer: Why it's, yes, why it's bounding.

Mr. Fitzgerald: So --

Member Ziemer: You know, we've bounded some sites with no data.

Mr. Fitzgerald: Right.

Member Ziemer: Although granted, they're much simpler than this site.

Mr. Fitzgerald: But, you know, we've been, we've been moving toward demonstrating the completeness of data that support representativeness, but it sounds like we may be beyond that and saying okay, can you demonstrate bounding.

Does that make sense?

So, I think that's kind of where we're at.

Co-Chair Anderson: And, that kind of goes back to also looking at how you calculate your 95 percent. You don't have a bell-shaped curve of exposure, so you have a --

Member Ziemer: No, it's a lognormal.

Member Lockey: Lognormal, it's still 95th.

Co-Chair Anderson: Yes. Well, but you have a whole lot as you said, the majority of them are non-detects. So, how you assign a value to the non-detect will, will impact what your 95 percent.

Member Lockey: Yes, but the non-detector most, it's mostly based on -- there's a lot of data on the non-detects.

Co-Chair Anderson: Well, I mean there isn't an exposure but when you're then trying to estimate what 95 percent is, it isn't that you're looking at -- it's a statistical approach to it, and it depends on what you assign to the value for the non-detects will impact the predicted 95th percent.

You don't look at what are the, what's the top 5 percent of the people? And, what is the value where you've cut 95 percent of the people are below that? This is a predicted.

Member Lockey: So, we looked at non-detect the way you did, the way you did it, or take -- divide by one half and do it that way. Either way, one way or the other, you get.

Co-Chair Anderson: Yes.

Member Lockey: And, you see if anybody falls above that 95 percent. Is there any data?

Member Ziemer: Right, that doesn't, that doesn't affect the 95 percent value very much.

(Simultaneous speaking.)

Mr. Fitzgerald: Okay, just to wrap things up, I think

we touched on these key issues. But in terms of our conclusions, you know, I think NIOSH concluded a large percentage of the subcontractors were, in fact, monitored for potential intakes while working under either a job plan, SWP, or RWP.

And, so we noted that that premise for the evaluation would hold for the Westinghouse era. I think it's pretty clear there was a very explicit RWP program with job-specific bioassay requirements and as a function of respirators.

But, we do not find that linkage as much in the DuPont era, or in fact, any evidence at all. And, that, I think, is a concern.

The SRS procedures and practices for RW required job-specific bioassays were not defined, codified or implemented.

So, as far as we can tell, until 1990 when Westinghouse came in and as part of the Radiological Improvement Program, basically overhauled most of the procedures, set up a Technical Basis Document, and actually brought these requirements into place and implemented them.

And, finally, we are concerned about the adjustment factors, and I say fungibility, that's an accounting term. But, you know, the fact that these percentages swing depending on what assumptions one makes, adjustments one makes, that as far as the time span and the, the other factors how you count those. And, I think settling on how one gauges that is going to be very important to the final answer of completeness.

And, finally, if the focus is job-specific bioassay completeness, I don't think that's explicitly confined to just subs. I mean I think other workers were on job-specific bioassays. I just wanted to throw that in because we've been focused on subcontractors quite exclusively.

It's really the job-specific bioassays as required by permits and job plans that were, that's the context of the discussion. So, I just wanted to -- sort of a post script.

That is it. Is there any questions on that end point?

Dr. Taulbee: We will provide the responses. I don't know when yet, certainly it would be after the first of the year. But I don't know if it will be in January or February.

But, I will, well, John will let you know, Brad.

(Laughter.)

Dr. Taulbee: When we get a date.

Co-Chair Clawson: I was waiting for that. I was waiting for John to make that call and I'm like okay, well.

Dr. Taulbee: But, we will let you know as soon as we get a time on the schedule.

Mr. Katz: Okay. Josh Fester, are you still on the line?

Mr. Fester: We're here.

Mr. Katz: Okay.

Mr. Johnson: It's Warren Johnson as well, also attorney for the petitioner.

Path Forward

Mr. Katz: Yes, I recognize your voice. Thank you, I'm glad you're here.

So let me -- there's a lot of background noise -- but let me just explain because I'm not sure you folks were on the line yesterday morning when I just talked about the general track we're on here and the upcoming meetings.

But, yesterday and today's meetings were sort of

focused on two things, two separate somewhat interrelated but separate things.

One is sort of giving a final approval to the guidelines that NIOSH and the Board use in assessing and developing -- developing and assessing coworker models, coworker -- the use of coworker data, or co-exposure data as we're talking about it now.

And, the second is sort of specific to the SRS, SEC petition.

And, next week as you know, we have a Board meeting. And, for the Board meeting and for this, the SRS-specific matters are really at this point, sort of with the Work Group and then the full Board will be doing is being updated on where we are with this evaluation, what we've learned, what we are able to address these Work Groups and what, and sort of a path ahead.

The action part of the Board meeting next week is, is limited to the, finalizing the coworker guidelines. The use of co-exposure data, so that, so that that approach can be used at other sites, too, because there are a lot of other sites that are sort of awaiting finalization on that matter.

So, and then I would say January, February, March. During that period, we will surely be having more Work Group meetings. They may be joint; they may be just SRS. I think in some cases, it's, I think it's been very useful to have both Work Groups together to discuss the SRS issues.

But in any event, we'll be having more Work Group meetings towards what we would like to see is action on the petition at the April Board meeting, and I don't have the date in my head, but it's like mid-April.

So, I just wanted to let you know A) that that's sort of the, the work plan ahead of us. And, then B) about commenting. Obviously, we're going to let

you comment now but, during the Board meeting next week, we're going to try to get through the discussion during the session that's there for both coworker exposure and the SRS matter update.

We're going to try to get through the discussion -- the Board. There's not likely going to be time but we'll see, for the petitioner representatives to speak during that. But, we would be open, happy, welcome your comments during the public comment session at the end of the day.

So, sort of plan on that although you know, and if you, you know, if we have time left, I kind of doubt we will, we have a two hour session to deal with coworker and SRS, but if we have time left, we, we could possibly fit you in during that session. But anyway, otherwise you'd have that opportunity at the end of the day.

So, I just wanted to let you know sort of the game plan so you can just understand where we are in the process and what to expect going forward. So, I hope that's helpful.

Mr. Johnson: No, it is and I appreciate that.

Mr. Katz: Okay.

Mr. Johnson: Now, if appropriate do I have time to, to make some comments at this time, or?

Mr. Katz: Yes, you absolutely, that's what we're here for.

Mr. Johnson: All right, sir.

I've listened with, with great interest the last two days and quite frankly, I'm concerned that well, I guess I'm concerned that NIOSH has lost sight of the actual mission here.

The issue to be addressed is simply has NIOSH demonstrated that it's feasible to reconstruct the dose for these workers with sufficient accuracy. You can't ignore the two main words of that sentence,

which is feasible and sufficient accuracy.

Feasible is defined as whether it can be easily done or achieved, whether it's practicable. You can't -- those considerations take into account both time, effort, and expense. And, this has been going on for over 11 years, this petition has been pending.

Many years before that NIOSH embarked on the quest to perform dose reconstructions with sufficient accuracy. Once again, now NIOSH is here today and yesterday, suggesting yet another new path forward conceding that we aren't there yet.

Quite frankly, I think the calendar itself is proof that this is just not feasible.

NIOSH has the burden of proving that it's met its charge. It's not done so. This isn't happening in a vacuum. People are being deprived of benefits that Congress intended for them to receive.

This isn't about academics. This isn't about whether or not NIOSH has done the best that they can. If they -- I don't question their effort, I just do question that this is, this has become an exercise in academics without really concern over what the focus should be is, is this feasible?

You can't ignore the second part of that either, which is sufficient accuracy. We've had evidence that records have been destroyed. We've had -- it's undisputed that if workers were supposed to be wearing respiratory protection, that that's an indication they were in an area that they should have been monitored, should have submitted bioassays. That's with radiation safety practice that's mandated by today's standards, and the records are missing on that.

To presume that the destroyed records have no bearing on this is simply inconsistent with common sense. In the law, we have pretty much every state adopts a rule of evidence that says that's spoliation of evidence, and that people don't destroy --

common sense tells you this: people don't destroy things that are helpful.

And, so missing records should be presumed to be both relevant and quite frankly, evidence of dose. I don't think you can assume that it's claimant-favorable while assuming that the records would have proved that the person didn't get exposed. That's just defies logic.

Again, I don't question the effort that NIOSH put into this, but I just don't think it's, based on what I've heard for the last two days, we're just compounding assumptions on top of guesses on top of what we believe as evidence that we've done the best we could. That's just not, that doesn't get to sufficient accuracy.

You can't, you can't compound guesses, put them in an elegant model and then end up with a sufficiently accurate result.

You can't change the sample sizes by redefining where it's appropriate just so you can feed that into a model. But, my concern on that is the coworker model that we discussed. In order to get a reasonable sample size, NIOSH had to redefine it as both monitored and effectively monitored.

Now, effectively monitored as I understand it, is simply a mini coworker model, which we don't even know whether you're accurately defining the craft, whether the person was doing the same thing as the monitored person was. There's just no way to know that. It's essentially a guess.

It's just it's beyond dispute that SRS had a problem with identifying and testing for the appropriate radionuclides of concern.

You know, I'm just a dumb lawyer; I'm not a health physicist. But as I understand it, it is indisputable that a bioassay at least in regards to the urinalysis would only find a radionuclide that they're looking for.

In other words, if you're handling plutonium, you had a update -- uptake of plutonium but you're tested for uranium, it's, you're going to show up as nothing. You didn't get a uptake according to your record then.

But that doesn't change the body burden that the worker actually received, and we can't ignore the reality of that.

The impact on these people is significant. We get people that are being deprived of health care and having to rely on their family members and neighbors and friends to take care of them as they're dying. That's not what Congress intended by this. And, I just don't know that putting it off yet again is going to do any good.

The fact that the site was supposed to be able to demonstrate compliance of radiation safety to show that these workers didn't receive a dose above the allowable level, but we're missing records. We're missing significant amounts of records.

There's been numerous assumptions made that, that they must not have been around it. They rely on the, in regards to the trivalent radionuclides, were relying on records that as I understand it, defy logic.

And, records that the MDA that they're claiming and going into the coworker model is achievable only through alpha spectrometry.

If you look at the Westinghouse paper, Evolution of Internal Dosimetry Bioassay Methods at Savannah River Site, according to it, they only implemented that technology in 1990. How did they apply that prior to having that technology is baffling to me.

That's yet another thing that I think has to be answered.

But, to a further issue is to consider somebody monitored simply because they were monitored for

any radionuclide is also ridiculous. That's just -- each of these problems undermines accuracy.

Each of these problems requires that to go back and be reworked and let's come up with yet another model, meanwhile, people are dying. They're being deprived of the whole point of this, which is to essentially let's take care of the people that were essentially sacrificed to allow us win the Cold War.

This is going on for over a decade at this point. It sounds like there's still no end in sight. I don't, it just does not seem that redefining just to make it sound like this is an actual model can possibly change the fact that the data is just not adequate to get there.

And again, you've got a inaccurate definition, or inaccurate monitoring that when you put workers into an effectively monitored category, that you're then going to use to couple that with some people that were directly monitored, and then you're going to formulate a coworker model from that. Well, that's a problem on its own.

But then, from there to add in when you apply it to the individual, the fact that there is strong evidence that their records were either inadequate, they weren't appropriately monitored, or they were destroyed, you just can't fix it.

The only fix is to, is to recognize that it's no longer, that this is just simply not feasible to be able to bind the dose for these workers with sufficient accuracy.

And, to simply put this off again and I understand that the vote won't come till April, but I anticipate that NIOSH is going to have yet another round of solutions for this, and that it will take yet another year or two for them to attempt to fix it. Then, there's going to be flaws in that.

How many years does this take? What is appropriate? I mean that's, that's the problem.

Are the Members of the Board comfortable that NIOSH has got it right this time? Because even assuming that it is, we're still looking at over a year to re-run these dose reconstructions at best. And, quite frankly, in all likelihood, be much longer than that.

I think clearly the answer is that they have not met the charge. And, that's not for lack of trying, that's pretty clear. But, that's quite frankly, that's based on the facts that exist, and that's the site's fault.

I appreciate your time and appreciate the opportunity to be heard.

Mr. Katz: Thank you, Mr. Warren, right?

Mr. Johnson: Yes, I'm Warren Johnson.

Mr. Katz: Yes, that's Mr. Warren, Warren Johnson, I'm sorry. Warren Johnson, I'm sorry.

Thank you. I appreciate you taking the time to comment, and to listen and to comment.

And, I think just a couple things I would just say. I don't think we're on an endless road anymore. I hope we're not, and I hope we will see actually action sooner than you're afraid we might not. So I hope we can solve that part.

And I also think it would be a good idea for the comments that you made today that are sort of of a technical nature as to how can this, how can that be, so on.

It would probably be good, I think, if we can take this transcript, Tim, and address some of those comments directly, that would be helpful for Mr. Warren. And all those comments that can be addressed.

Yes, but we are doing that and on the NIOSH team but I think, I think they should be sort of addressed to he's representing the petitioners here and they deserve to sort of understand some of those issues

that he's raising in sort of the simpler context that he poses them.

So, thank you, Warren --

Dr. Ringen: Ted?

Mr. Katz: -- and -- sorry?

Dr. Ringen: Ted, it's Knut Ringen. Can I make four very brief comments since I'm not going to be at your Board meeting?

Mr. Katz: Yes, of course you can. We have, yes, we have time. Go ahead.

Dr. Ringen: Going to be very fast.

The first is that the, I want to thank you, Mr. Johnson, for making his comments because they're entirely fair. There should be some time estimate and we've talked about this before.

And the real problem is that to receive sufficient accuracy requires that sufficient accuracy be defined somewhere and you've still not done that.

When Tim Taulbee says we feel this is within the realm of sufficient, sufficient accuracy, I cringe both at listening to the word feel, and the way that the word sufficient accuracy is used.

The point I'm going to make is really quickly that you can't, first of all, you cannot do the coworker modeling without stratification I'm sorry to say, but you can't do it with stratification either. And that's the problem.

Through stratifying your numbers become too small, and if you don't stratify they become too general.

Dr. Lockey suggested that we can compare different trades but you can't do that. A boilermaker does something that's totally different from an electrician.

And within trades even, there are lots of sub-trades. Just like in the medical trades, there are sub-specialties and specialties, and you cannot compare exactly what they do. They work entirely different ways. And you have to take that into account.

You cannot rely on the radiological work permits, or any other work permits to do a very clear definition of how work is done. That's even true today. We know that the radiologic work permits are administered for very old houses, site work supervisor works them. And they are very different -- there are lots of variance in the management of work permits that needs to be taken into account. It is not possible to do that statistically.

And, finally, imputation is in statistics, a measure of last resort. And if you have lousy data to begin with, and you try to impute more of the same lousy data into them, you're still not going to get a very good inference in the end.

And I think that to assume that you can do this correctly and with any degree of fairness to individual claimants is incredibly unlikely.

Clearly, a good number of claimants are going to be denied benefits that they would have if you continue along this road of coworker modeling.

And perhaps maybe 5 percent is okay with you. Maybe that's sufficient accuracy. But, for those individuals who end up being denied, it certainly is not.

Thanks a lot.

Adjourn

Mr. Katz: Thank you, Knut. So any others?

All right. Well, again, I appreciate everyone's hard work coming up to this meeting, the meeting itself, I much appreciate the attendees -- attendance from the public as well, and we'll see some of you next

week in California.

Thank you, we're adjourned.

(Whereupon, the above-entitled matter went off the record at 11:36 a.m.)