U.S. Department of Health and Human Services
Centers for Disease Control
National Institute for Occupational
Safety and Health
Advisory Board on Radiation and Worker Health
Joint Meeting of the
Savannah River Site (SRS)
And
Special Exposure Cohort (SEC) Issues
Work Groups
Thursday, November 17, 2020

The Work Groups convened at 10:30 a.m., Eastern Standard Time, via video teleconference, Henry Anderson and Bradley Clawson, Co-Chairs, presiding.

Present:

Henry Anderson, Co-chair
Bradley P. Clawson, Co-chair
Josie Beach, Member
James E. Lockey, Member
David B. Richardson, Member
Genevieve S. Roessler, Member
Phillip Schofield, Member
Paul L. Ziemer, Member

Also Present:

Rashaun Roberts, Designated Federal Official
Nancy Adams, NIOSH Contractor
Bob Barton, SC&A
Ron Buchanan, SC&A
Zaida Burgos, CDC
Grady Calhoun, NIOSH/ORAU
John Carderelli, NIOSH/ORAU
Joe Fitzgerald, SC&A
Roger Halsey, ORAU
Warren Johnson, on Behalf of Petitioner
Mark Lewis, Subcontractor to DCAS
Mike Mahathy, ORAU
Jenny Naylor, HHS OGC
Chuck Nelson, NIOSH/ORAU
Kathy Robertson-Demers, SC&A
Lavon Rutherford, NIOSH/ORAU
Tim Taulbee, NIOSH/ORAU

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Proceedings

(10:30 a.m.)

Welcome and roll-call/introductions

Dr. Roberts: So, this is the Advisory Board on Radiation and Worker Health. I'm Rashaun Roberts, I'm DFO for the Advisory Board.

And this is day one of a two-day joint meeting of the Savannah River Site Work Group and the SEC Issues Work Group.

The second meeting session, for those who may not be aware, will be on this coming Friday, November 20th, starting at 10:30 a.m. Eastern, like today's session.

So, I want to let meeting attendees, both on Zoom and those who might be participating by telephone only, that the agenda and all of the background documents and presentations for both days of the meeting are on the NIOSH website, under schedule, meetings, today's date.

And as you will see, there is a lot of material posted there for you to review and read through, as you might see fit.

If you have taken a look at the agenda, you will notice that today's session is focused primarily on Savannah Site Working Group, with the November 20th session focused both on Savannah River and the SEC Issues Working Group. So, if you didn't notice that, I just wanted to highlight that for you.

Before we move into the SRS Work Group business for today, let's of course get started with roll call. And I would like all Working Group Members and staff to address conflict of interest during the roll call.

To simplify things a little bit, I will speak to conflict of interest with respect to the Members of the SRS Working Group. So, in order for them to serve on this Working Group, they can't have any conflicts of

interest.

So, with that, let me move into the roll call for the Members of the SRS Working Group. And starting with our Chair, Brad Clawson.

(Roll Call.)

Dr. Roberts: Again, welcome to you all. Just a couple of items before I give the floor over to Brad Clawson, who Chairs the SRS Work Group.

Are you all hearing an echo?

(Pause.)

Dr. Roberts: Okay. Now, I'm not sure what I can do to adjust that. But let me go over a couple of additional items.

So, in order to keep things moving smoothly, so everyone can be clearly understood, please mute on Zoom. Again, the mute button is on the lower left-hand corner of the screen. Unless of course you're speaking.

If you're --

Mr. Halsey: Excuse me?

Dr. Roberts: Yes.

Mr. Halsey: I'm sorry, I just found my mute button. This is Roger Halsey with ORAU, no conflict.

Dr. Roberts: Okay.

Mr. Halsey: Sorry about that.

Dr. Roberts: Okay, anyone else? Okay, great.

So yes, if you're calling by telephone press *6 to mute and then *6 to take yourself off mute if you need to speak.

If, again, if you didn't hear earlier, the agenda and the presentations and background materials that are

relevant to today's meeting, can be found on the NIOSH DCAS website. And all of these materials were sent to the Board Members prior, and to staff, prior to the meeting.

And I do want to note that there is a lot of content to cover in these two days, and we have done our best to organize the content for you. But please bear with us, some things may seem redundant across presentations. So just bear with us.

So with that, Brad, I will give the floor over to you. If you're able to speak.

Chair Clawson: Yes. It's not connecting to me, it's saying I've got a bad passcode and kicked me out of the meeting.

So anyway, I'm Brad Clawson, I'm the Work Group Chair for the Savannah River Work Group. This has been a long time coming.

I am a little bit disappointed though, and I want to make this upfront, that we did not get NIOSH's report until yesterday, to be able to even review. They have an awful a lot to be able to go over on this, and timeliness in getting things out is really critical. Especially in this kind of stuff.

So, with that being said, we'll go ahead and kick this off. I'm going to hand it over to Joe Fitzgerald or SC&A for the review of 0092 and go from there.

Joe, I'll turn it over to you. And I'll keep trying to get logged in.

1. SC&A Review of RPRT-0092 (sub-CTWs monitoring practices between 1972 - 1998)

a. SC&A recap of its RPRT-0092 response

Mr. Fitzgerald: Alright, thank you, Brad. Can everybody hear me alright? I would assume so.

Dr. Roberts: Yes.

Mr. Fitzgerald: Okay, good. Okay, good. Now, this is in the agenda as a recap, and it is essentially the same findings and discussion that we presented last December.

We have updated it slightly, so it's in the context of NIOSH's August response. So, it's just so it makes more sense when Tim and John give their presentation based on their most recent review. There is some additional information their presenting.

So, anyway, I guess --

Dr. Roberts: Joe? Joe, I'm --

Mr. Fitzgerald: Hello?

Dr. Roberts: -- sorry to interrupt.

Mr. Fitzgerald: Yes.

Dr. Roberts: I can hear the echo, I'm wondering if it's disruptive enough to try to adjust. Can --

Mr. Fitzgerald: Well, let me --

Dr. Roberts: -- the court reporter --

Mr. Fitzgerald: Yes. Let me see if it's because I have a phone connection as well. Hold on.

Dr. Roberts: Okay.

Mr. Calhoun: We can't hear you now, Joe.

Mr. Fitzgerald: Okay, how is that? Is that better?

Mr. Calhoun: We hear you, but with an echo.

Mr. Fitzgerald: Let me, okay.

(Pause.)

Dr. Roberts: So, sorry, Joe, did you want to try to start the presentation again?

Mr. Fitzgerald: Can anybody hear me? Hello?

Mr. Calhoun: We can now.

Mr. Fitzgerald: Okay. I'm just trying to figure out, I have a phone connection as well as a Zoom connection so it's --

If I can be heard, I will go ahead and proceed, if that's alright, Rashaun?

Dr. Roberts: Yes. Please go ahead.

Mr. Fitzgerald: Okay. Fine. Again, this is a recap of something we presented last December, so I'll go through, relatively quickly. And if it's too fast, please stop me if there is any questions.

But we, in fact, we're tasked to review 0092 over a year ago. And it provides the results of NIOSH's sampling analysis, '72 to '98.

And the question, the essential question it's designed to answer is, and this is right from the sampling plan in the report, did unmonitored workers work in the same environment as monitored workers at the time? We're talking subcontractors.

I'm going to emphasize, at the same time, because I noticed in NIOSH's presentation, at the same time is left off the objective. And I think for transient subcontractors who were in and out often, and it was a job-by-job, task-by-task type of activity, the time issue is a critical one. It does need to be a review of permits and bioassays at the same.

And that can be certainly some difference but not a large difference in our view.

At any rate, this review follows our 2017 review. And the impetus behind all of it, and this was one of the primary findings was that Westinghouse, in a self-assessment of its own bioassay program, found almost 80 percent of its job-specific bioassays. Ones that were required by RWPs missing in '97. A large number.

And the question that that posed was whether that

gap, that incompleteness, might figure in years previous to 1996 to '97. And that was a driver behind the analyses that the Board requested be done, in which it certainly figures in RPRT-0092.

In any case, we reviewed the report that was issued and presented the findings last December. We did get some initial reactions and feedback from NIOSH in a Work Group discussion back then.

But the formal response, the actual written response, was provided in August, this past August, in terms of 0092. In terms of SC&A's review of 0092.

Next page, Bob. Next slide. There we go. I'm not going to dwell on this. I know John will probably cover this in some detail in terms of the RPRT-0092 conclusions, but the overall conclusion was that there was a large percentage of subcontractors who were monitored for potential intakes while under a job plans, a special work permit or a RWP.

Next slide please. Okay, so our approach, and we've covered this last year, but we wanted to do a pretty comprehensive look at how this was done.

If you may, a weight of evidence type review. One that looked at both the premise behind the sampling, how the sampling was actually executed in terms of the actual data that was reviewed.

And to look at the exposure data sets do indicate that monitored subcontractors, and unmonitored subcontractors, work side-by-side (audio interference) in '89. April 1st '89.

So essentially, this is the Westinghouse operating error up through the end of the SEC qualification period. Not SEC, but petition qualification period of, that was under Westinghouse.

So finally, we were looking at this representation question. The real question is, the representatives of the subcontractor bioassay data were in fact bioassays required by, whether it's job plans, SWPs,

or RWPs, were they sufficiently represented in the database such that a co-exposure model would encompass them and you would have a representative database. That was the bottom line.

Okay. Okay, Finding 1. Our biggest concern, as we indicated last year, is that we went through the DuPont era. SWPs and job plans.

And what we were looking for was the, the first evaluation objective of RPRT-0092 was to determine the percentage of subcontractors monitored for bioassay, and this is right from the report, in the context of ascertaining whether gaps existed, as in the '96, '97.

So, again, the percentage of subcontractors monitored. And it was to be a direct measure of the RWP to bioassay relationship.

And we call it linkage in our response. But it's basically a relationship of the job-specific bioassays to the permit. The RWP that requires the bioassays.

And looking at that evaluation objective we just could not find evidence about the relationship. That linkage.

No SWPs or job plans that we looked at, and we've looked at them all, for '72 to '90, contain any requirements for job-specific bioassays. Even where under SWPs you had to check off for bioassays. None of the ones that we could find had that checked off.

And so our concern was, it brought into question whether in fact you could satisfy that first objective and demonstrate that in fact you had a bioassay-to-RWP relationship upon which you could look at completeness.

Now, next one in terms of the NIOSH response. Okay. In the August response NIOSH, I think, emphasized that they had a ample number of bioassays who states can be associated, and this is from the report, with those who need permits and job plans, with the

assumption that these bioassays would have been obtained. Okay.

And it goes on to point to the Farrell and Findley report and some of the DuPont procedure requirements as a basis for assuming that bioassays would have been done in response to the job plans in SWPs.

Next one please. The response -- our concern is that we think this really, really retreats from the original sampling approach.

This was to examine the job-specific bioassays called for in the permits. And in our view, this cannot be accomplished for '72 to '90 because, essentially, in the DuPont era you did not have accountable RWPs being implemented. And there were no site-wide requirements for these bioassays to be performed as a condition of the SWPs and job plans.

So, if you're directly measuring the relationship of RWPs to bioassays at the measure of completeness, we just don't think that's feasible. You can't satisfy that objective.

Going further, looking at associating, and this is a term that's used in the latest response, bioassays for permits by roughly, I would say, if not the date, a close date, does not account for whether or not the specific task was in fact the task that would have called for that bioassay.

Again, keep in mind these are transient subcontractors who were under specific job plans that were doing tasks that would have differed from day-to-day perhaps. It wasn't clear what the source term or the particular task might be, but you definitely would have to look at, as the original objective called for, the timeframe, the same timeframe, for the jobs involved and be able to assess those jobs in terms of the similarity.

And then again, on respiratory protection, I think we were clear that those procedures for job-specific

bioassays that were incumbent upon those with respiratory protection did not come into being at Savannah River in a formal procedure until the Westinghouse era.

So, again, you can assume that they would have had bioassays. And you can try to link that assumption. But it didn't exist in reality so there is no way to know how you can peg that.

Can I have the next slide on Finding 2? Okay. In this case we were concerned about radionuclides of interest, and we questioned how accurate they would be and whether in fact they would in fact have been referenced adequately in the permits. To the job plans and SWPs in that DuPont era before 1990.

And NIOSH, in its response, frankly contended that prior to 1990 there were a number of ways that DuPont could have done source term characterization. And there was a number of examples provided in the August report. And I have listed them there.

But these were all capabilities. These were, as NIOSH put it, some evidence that they in fact had the means to characterize source terms in different ways.

Our response, essentially, and I'm going to boil this down to one thing. That essentially the DuPont era procedures did not provide for a specific or analytic based characterization process in general and one specifically that would have identified source terms for the SWPs and the job plans.

And I think the strongest, if I may, independent assessment of that question was the Tiger Team review. Where you had a, an independent health physicist that reviewed the Savannah River program in 1990.

And I went ahead and cited that finding there, but what their finding essentially says is that the internal dosimetry program does not comply with the DOE order. And more specifically, that the radiologically

areas at Savannah River have not been sufficiently characterized.

To provide a technical basis for the assignment of bioassay sample, types and frequencies. Okay, that is very specific to bioassays in terms of the types and frequencies that were being mandated for the various facilities and operations at Savannah River.

They did find one exception, which was the Naval Facility that was co-located at Savannah River. And they indicated that there were other discrepancies that they felt hampered appropriate site characterization.

And I guess our response to NIOSH's response is that, and this is not too unusual at DOE sites, just simply because they had the technical capability to do so doesn't necessarily translate into actual practice. That they actually applied it to the work permits or the job planning process.

And I would go so far as to say, that actually in Westinghouse's response to that Tiger Team finding, they agreed that the facility characterization, upgraded --

Ms. Burgos: Hello?

Mr. Fitzgerald: -- facility characterization was needed. And they in fact went further and developed a TBD that included that.

Dr. Roberts: Hello?

Mr. Fitzgerald: And conducted a site-wide characterization in 1990. Is somebody --

Dr. Roberts: Hi. Sorry about that, I was hearing some speaking in the background.

Ms. Burgos: No.

Mr. Fitzgerald: Oh, okay.

Ms. Burgos: No. No, less, because we just refinanced.

Mr. Fitzgerald: I hear it.

Dr. Roberts: It sounds like Zaida.

Mr. Fitzgerald: Okay.

Dr. Roberts: Zaida? Zaida, can you hear? Sorry, Joe. I think you can go ahead.

Mr. Fitzgerald: Okay. Well, let me continue. Again, I'm just going to keep moving through this because we did cover this in some detail last year.

Our Finding 3 was, that the scope of the permit sampling for the, again, the DuPont years, essentially the '72 to 1992. And we added 1990, even though we know what, DuPont left the site April 1st, 1989 because, again this, I think agreement, that there were no RWPs. And I don't believe there were job plans for 1990. So there is a gap there. So we intend to include 1990 into the '72 to '89 era.

But in terms of the scope of permit sampling during that period, as we pointed out, it's essentially limited to one facility, 773-A, the laboratory. And again, we think this falls short of the sampling objective where originally the basis for 0092 was in fact to do sampling of various facilities at Savannah River.

And it was actually a Board concern, which lead to, one of the key impetuses to doing 0092, the survey analysis that was done in 0092 was the fact that earlier analyses, and the one that was done for '81 to '86 for 773, and the one that we did, which was only for, essentially the '90s, didn't really answer the question from a scoping standpoint of, what were the -- was the subcontractor job-specific data complete and representative enough based on a site-wide review for the years in question.

So, in terms of expanding the assessment to characterize the site in terms of the representatives of this data, we still are kind of stuck with one facility where that can be done in detail for the years in question, and that's 773-A, for the earlier years.

Now, after 1990, with the 852 boxes of records, very clearly there were many more RWPs which does provide a much better basis for the latter period under Westinghouse, to do this analysis. Although we still have some issues, which we'll get into. But certainly for the earlier periods, 773-A is essentially it.

In our, certainly the NIOSH response for Finding 3 was that that they were -- that the subcontractors were adequately monitored in areas outside 773-A because the CTWs were monitored based on the radionuclides of interest in the similar to the prime contractor workers. So in other words, there is a statement that the, since the monitoring was the same then that would represent adequate monitoring all around.

There is a review in coding of plutonium logbooks, which enumerates more sampling for plutonium for the subcontractors for various facilities.

And there were a number of subcontractors having plutonium in fission product urinalyses and whole-body counts based on the RPRT-0094 assessment of NOCTS data. So there is several additional sources of what would constitute what, I think, NIOSH is considering to be ample data available that would supplement the review that was done for 773-A and bring in additional facilities in the area.

Our response on Finding 3, however, is that no matter how you slice it, in terms of the permit review, looking at the direct relationship that would answer the question in completeness, we're still talking one facility, 773-A for the DuPont era. So, what the Board had requested as far as an expanded scope just wasn't possible.

And again, it wasn't from lack of effort, it's just that the availability of the records did not turn out to be the case for the earlier years, we still only have pretty much the records for the DuPont era in terms of the job plans in the SWP.

So, certainly (audio interference) --

Member Ziemer: We have lost the sound --

Chair Anderson: Can hear.

Member Ziemer: -- for Joe.

Chair Anderson: We can't hear.

Dr. Taulbee: Joe, your sound just dropped out.

Dr. Roberts: Can you hear us, Joe? It looks like he's trying.

Court Reporter: This is the court reporter, I've lost him as well.

Dr. Roberts: Joe, can you hear us? He's still talking.

Member Beach: I just gave him a call so hopefully he, he did answer.

Member Ziemer: He's moved to Finding 4 --

(Simultaneous speaking.)

Member Ziemer: -- but I don't think we've tried Finding 3 yet.

Member Beach: No. I think he's working on it.

Mr. Barton: I lost audio on my phone real quick there. I mean, can anybody hear me?

Member Beach: Yes.

Mr. Calhoun: Yes. We can hear you, but we can't hear Joe yet.

Mr. Barton: Okay. Yes, I got cutoff my phone line, so I just, computer audio. So that probably happened to Joe.

Member Beach: Right.

Dr. Taulbee: I think we're still back up on Finding 3 though.

Member Ziemer: We lost him find of in the middle of Finding 3.

Dr. Roberts: Okay. It looks like he's trying to connect.

Mr. Fitzgerald: Am I coming through now? Hello?

Dr. Roberts: Yes. I can hear you.

Mr. Fitzgerald: Okay. Somehow I got, my phone line cutout. That's kind of odd.

Dr. Roberts: Okay.

Mr. Fitzgerald: Okay.

Dr. Roberts: Joe, we lost you in the middle of Finding 3.

Mr. Fitzgerald: Okay.

(Laughter.)

Mr. Fitzgerald: Well, you can pretty much read what I was saying there.

The major concern is that because of the nature of the work that subcontractors may have done in terms of being transient, doing day-to-day tasks, we think, again, it's particularly important, one, to have a handle on the specific nuclides that were involved. In some places they were unconventional nuclides.

And also, to have a good handle on the nuclides that would have been important. The radiological, the radionuclides of concern for the other facilities, not just 773-A.

And with all difference to Farrell and Findley, which I think is a pretty good analysis, that's 1998 and one that was a fairly comprehensive, analytic-based review of source terms that in 0092 is proposed to back apply to other facilities in earlier times.

And we covered that in our report, but we believe that's not substantiated in, more so in the view that, in the Tiger Team review, that certainly the

characterization wasn't done properly.

Okay, if there is no questions, I'm going to go to Finding 4. And everybody still can hear me, I hope.

Okay. On this one I'm going to --

Member Ziemer: So, Joe, are you taking questions as you go or you want to wait till the end?

Mr. Fitzgerald: If it's easier that way I, since this is a Work Group I would invite that, just to kind of keep continuity.

Member Ziemer: Well, could I ask a clarifying question?

I think this is more, this is Ziemer for the court reporter. On Finding 2 I just have a question for clarity, that I think I know the answer, but I want to make sure I clarify it. Because, Joe, as you know, I put a lot of stock in that Tiger Team report.

But is it, did DuPont have any requirement that bioassay must be carried out if respiratory protection was used?

And what I'm getting is, is there an implicit sort of built-in requirement that if the work order required respiratory protection, then you automatically kick in bioassay without having to put it in a check box. I think --

Mr. Fitzgerald: Yes.

Member Ziemer: Let me ask you --

Mr. Fitzgerald: Okay.

Member Ziemer: -- to just specifically clarify that.

Mr. Fitzgerald: Yes. Actually, the, in terms of respiratory protection, both the job plans and SWPs did have a checkoff for respiratory protection.

And unlike --

Member Ziemer: Yes, I know that. But what I'm saying is, would that have kicked in the site-wide requirement for bioassay that didn't have to go into the work plan.

Mr. Fitzgerald: Yes. There wasn't a site-wide requirement, it would have been a facility manager call. The site-wide explicit, and you used the word implicit, and I think there was an implicit, good practice type of thing where if you're wearing respiratory protection an HP would certainly, would want to see some bioassay.

But as far as an explicit site-wide procedure, that was codified by Westinghouse in its improvement program in the early '90s. I think '92, '93, where that was included in the, what they call the 5Q1 procedure. Where one would have to in fact do a bioassay if respiratory protection was called for.

So I think, to use your terminology, was more implicit then and more up to the facility manager and the HPs, whereas it became an explicit requirement in the early '90s.

Member Ziemer: So, can you tie that in with the Tiger Team finding that you cited. Does that have to do with tying those two together or is this simply a separate issue on their dosimetry program per se?

Mr. Fitzgerald: This is somewhat separate. We focused on the question of source terms because in the 0092 report it has a hierarchy of how the assumed source terms would be applied in the analysis that NIOSH did.

And it went from the nuclide being identified on the SWP, or job plan. Of course, we found none that that was the case. That didn't come later till the RWPs in the '90s.

Or if the procedure, the second level on that hierarchy was just the procedure, in the case of DuPont, that DPSOL or DIPSOP, required the source term to be identified and addressed.

And as NIOSH pointed out quite correctly, it's obviously, the DPSOLs were pretty general. They were not specific in these requirements.

They were more performance-based, if you remember that term. And so, that wasn't a claimed basis for applying the source terms in NIOSH's analysis in 0092 as well.

And the third level in the hierarchy was the Farrell and Findley. Which was the 1998 comprehensive analytic-based characterization. This is with all the bells and whistles. They looked at waystreams, they looked at actual operations, and essentially moved the sample type and frequency. Actually, they discarded the sample type and frequency table as the basis for identifying source terms for permits and went to what Farrell and Findley provided, which was a pretty detailed guidance. And that is, in the RPRT-0092, was back-applied from the 1998 document.

The Farrell and Findley document was back-applied. And that's the basis for the source terms that were used in NIOSH's analysis.

And two things that we point out in that regard is, one, the, again, the Tiger Team was very explicit that DuPont was not in fact providing a up-to-date operational basis for its source terms. That the assignment of the bioassay types and frequencies in the job plans, the SWPs, and whatever RWPs they might have done, which were very few, would not have been adequate because they would not have been correct.

And that's kind of what Finding 2 basically says, that we can debate this but frankly, the procedures were general, the SWPs and job plans did not include specific citations. And we believe the Farrell and Findley, although that's perhaps a Cadillac version of site characterization, that came along in 1998. And in terms of trying to use that backwards, we don't think that's appropriate as far as the back-application.

That in fact, the characterizations were not adequate in the DuPont era and there would be no way of being able to pin down, allow these very specific source terms that the subcontractors may have been exposed to doing day-to-day work of specific tasks.

I mean, even, I think Farrell and Findley in one passage, made it clear that places like 773-A dealt with a whole spectrum of source terms, radionuclides, that were unconventional. Would not likely be caught by the kind of bioassay type of frequency assumptions that were brought forward but not updated.

So, finding 2 is just kind of on source term, more specifically.

Member Ziemer: Thanks. And I assume when we get to the NIOSH response, Tim, your people address their --

Dr. Taulbee: Yes.

Member Ziemer: -- point of view on this same question, I supposed.

Dr. Taulbee: Yes, that's correct. I just wanted to quickly clarify that one of the things that Joe said at the beginning is that there was not a formal requirement of people who were wearing respiratory protection to be on bioassay during the DuPont era.

Our selection of those RWPs in RPRT-0092 was that those workers would have a higher potential of somebody who would be exposed, and therefore we wanted to look at whether they were monitored via bioassay.

There are many job plans that did not require respiratory protection. And even some of those that did require respiratory protection, when we looked at contamination surveys that were conducted in conjunction with the job, if there was no contamination found, that was noted in there and there would not be any subsequent follow up

bioassay.

But again, we were trying to single in on a population that could have been exposed to airborne radioactivity, that could have been a hazard, and whether or not those workers were monitored. Thank you.

Member Ziemer: Thank you.

Mr. Fitzgerald: Okay, I'm going to jump back to Finding 4 if my slide mover can get me there.

Okay. I'm going to be pretty quick with this one because our concern here is more basically whether the incident-based data that was cited in RPRT-0092. And this was the incident-based/special bioassays for F and A areas were reviewed, identified and found to be, found to have a high measure of completeness and no systemic issue.

And our contention was, we're not arguing with that finding because it obviously is factual. But it's not -- it wasn't to the point in terms of what we were saying in Finding 4.

We're not contending that incident-based/special bioassay sampling was not an integral component of the SRS bioassay program. Which was one of NIOSH's point.

We're not saying that there was in fact a high measure or completeness of incident-based/special bioassays in F and A areas. And we're not claiming that the IG-006, the criteria for evaluation, used coworker data sets, did not in fact permits its used as a co-exposure modeling input. So we're not making any of those claims.

What we are emphasizing though, and if you could move the slide one, at the bottom we are saying, and I think NIOSH actually agrees, that the inclusion of this incident-based data should not be meant to complement the completeness of the non-incident/non-special bioassay data.

So next slide. What we're concerned about is that if we're looking at completeness of bioassay data, next slide. Okay. No, the one before that.

What we're basically saying is that the incident data, base data, should not be used to complement the non-incident/non-special bioassay data. Because of course, it's pretty clear that when you're talking special bioassays at Savannah River, that the procedures were very precise. The accountability was very strong.

And management track, as you would expect they would track special bioassays, so you're talking about a intake driven incident, both times. So if you're looking at the degree of completeness of bioassays in response to the impetus for taking those bioassays by including special bioassays, the incident-based bioassays, you're going to inflate the overall numbers, the success rates if you want to call it that.

So our caution is that we do a -- we don't believe that the incident-based data should be included in that assessment because it's going to be misconstrued.

And in NIOSH's response they agree that incident-based data should not be used to complement the data. So really, that's all we were saying. So we have no further issue, except the inclusion of that data in the report continues, and it's there.

And I think the Work Group should be aware that even though the percentages of completion are very high, it doesn't necessarily bear on the completeness of job-specific assays per se. That's all we're saying there.

Okay, Finding 5. Okay, so we were raising a question of incompleteness of dose records given the acknowledge destruction of those records. And this is something that we have raised repeatedly since 2017. So it's not a new issue.

What has drawn us out more specifically in our response is that, and if you can skip over to the

response, Bob, was that there is a statement in NIOSH's finding that "only one area," and this is A area, "appears to have routinely used SWPs or job plans in the 1972 through 1989 DuPont era."

And in our -- I think you're on the wrong slide. May I have Slide 19 please? There we go.

And in our response we explicitly call out that one finding as being potentially misleading because it's not a question of only area appearing to have routinely used the SWPs or job plan, it's just the fact that is was the availability of records that connotes that.

And given the destruction of records, it's just as clear that this is likely, and perhaps more likely, that the records for the other areas were just not available because they were destroyed. So, I don't think there is any disagreement that it's not just that the SWPs or job plans were only routinely used for one area, it's really that they're unavailable for the other areas due to likely destruction when DuPont left the site.

Secondarily, we did repeat the concerns that we've had before that, based on interviews with workers, subcontractors from that time era, there were destructions of, and I just wanted to include these quotes from the interviews, all kinds of records. Including monitoring records and timecards.

And our concern is whether that has any implications for the identity and whether the monitoring records, writ large, include anything that would be of concern.

I don't want to -- this isn't particularly central to the question of the representatives of the data per se, but it's a concern that the actual review of what specific records were destroyed in 1990 and what implications they may have has not been pursued except for the acknowledgment that in 2001 that the dosimetry records appear to be complete. There has been no signs of discrepancies.

And the NOCTS claimant files appears to be

complete. So from an empirical standpoint so far there doesn't seem to be any evidence.

So, again, what we're just acknowledging is that so far no evidence of records gaps, but certainly a number of other records have in fact gone missing.

Skip to Observation 1. Slide 21. 21. Okay. This is an observation. I wanted to, certainly it's just one that we were concerned about the fact that a lot of the analysis in 0092. And a lot of the premises behind the analyses seem to borrow from procedures, policies, and practices that were clearly ones that were in place, but ones that did not actually get implemented until the earlier '90s.

And NIOSH disagrees with that and made it clear that they felt that the policy, practices, and procedures were pretty constant from '72 to '98.

And our, I guess our only response, and this, again, this is an observation so we'll leave it as it is, is that for the specific, and this is Slide 23, for the specific examples that are at the core of the RPRT-0092 completeness analysis, we want to make it clear that we see distinct differences in those practices and procedures between DuPont and Westinghouse that makes it difficult to do a coherent and complete analysis over those 25 years. Because starting in about '89 and '90, '91, you had several major programmatic changes that altered the way business was done in terms of radiological bioassay control. And I just provide three specific examples.

And I think that was a contributing factor, a major contributing factor, to why what was capable of being done for the Westinghouse timeframe, as far as looking for a relationship, a direct relationship between the RWPs and the job-specific bioassays in terms of both representatives and completeness, wasn't feasible for the DuPont era because you had to make assumptions that even though they made sense for Westinghouse wasn't in fact reality for DuPont. That these procedures did not exist, practices weren't followed, and therefore the

conclusions that you reach are consistent into those early years.

So, again, I think that the Observation 1 wanted to look at what seems to be a root issue. It seems to be, certainly that seems to be one of them.

Okay, that's kind of the first part of this, which deals with the premise or the programmatic part. I think Bob and Ron are going to look at the execution part.

Mr. Barton: Yes, thanks, Joe. I just let me make sure everybody can hear me okay. Can you hear me all?

Member Beach: Yes. Yes.

Mr. Barton: Okay, great. Thank you. Alright. As Joe pointed out this analysis in RPRT-0092 is sort of separated into two main theories, the DuPont era, which, again, ended in April 1st, essentially, 1989.

There is a little gray area in 1990, which Ron Buchanan will get into. But what we are going to talk about right now is really that earlier DuPont period from 1972 up through 1989.

So this gets into Finding 6, and I'll just read this to the record. It says "For the period 1980 to 1989 only 20 percent of the identified subcontractor-job plan combination is identified by NIOSH as requiring americium sampling had internal monitoring performed within an acceptable timeframe."

And this is one issue that we brought up in our review of the dataset provided by NIOSH is that, you know, sort of direct monitoring is going to be both urinalysis and in vivo counts.

However, when you are talking about chest count data NIOSH, through its own procedures, state that you have to restrict it to within two years for Type M material because it clears the lungs very quickly.

So in the actual dose reconstruction procedures, and I believe it's 260, internal dose reconstruction, it does state that periods longer than two years should be

considered unmonitored.

So basically when we at SC&A went back through the analysis presented in RPRT-0092 we didn't consider a valid monitoring result after two years for americium.

Plutonium also if it was Type M, of course, there is probably is some examples of Type F and Type Super S, which I know NIOSH will get into in their own presentation, but essentially what we did is make adjustments where there were matches made for americium monitoring associated with the job plan.

And, again, it's restricted only to the F-Wing area of 773-A. So as Joe mentioned earlier in the presentation the job plans available for analysis under RPRT-0092 were really restricted to just A area and for americium specifically it was restricted only to the F-Wing of A area because that's where they actually separated americium from other products such as plutonium, obviously.

Americium and plutonium are usually joined at the hip, but in the F-Wing area they were actually separating it out, and we're going to get into some of the -- there is at least one other area and there might be a third area, I'm not quite sure, but we'll get into that.

So just to quickly summarize NIOSH's response, I know they are going to want to do their own presentation, but essentially we see the response as this, is that the exposure potential was very limited, again, only to those areas where americium was separated, because it was generally commingled with plutonium.

And so those two areas are the F-Wing, as I just mentioned, but also the Multi-Purpose Processing Facility, MPPF, which was located in F area, not to be confused with the F-Wing of 773-A. This is a completely different area.

And, also, NIOSH points out that there are only 15

documented intakes related to separated americium and that there were over 80 subCTWs that were monitored via the urinalysis program from 1972 to 1989.

So I guess what we want to sort of point out here is that, you know, only the F-Wing was analyzed, so they did not have any analysis of the MPPF in the F area, which also had separated americium.

And, again, the scope is very limited. There is only one job plan that was identified in 1973 and there was no associated internal monitoring for that and then the remaining job plans were only from 1981 to 1987.

There were 34 total that were available for analysis and no job plans were identified for the Multi-Purpose Processing Facility.

Now a third facility that I am not sure about and I wasn't able to get a lot of information on, I basically pulled what I could from the Technical Basis Document and what was available in the SRDB, but I'm not sure.

There was another facility called the New Special Recovery facility that was basically there to separate plutonium to re-use it. So, obviously, if you are separating out the plutonium americium is going to come out of that separation process.

So we are not sure if that is a third facility that should be considered, but, again, all we have is the job plans from 1981 to 1987 at 773-A F-Wing.

We appear to agree that only 20 percent of those subcontractor and job plan combinations were directly monitored, and that includes both in vitro and in vivo.

And really I tried to focus in on what we feel is the key question is: has adequate evidence been established that the job-specific monitoring program was sufficient to detect the intakes from separated

americium where it is not commingled with plutonium where you might be able to use some sort of ratio to get at a dose reconstruction approach for the americium component?

What we are really worried about is these facilities where they were separating out americium and how well did they monitor for that. So that was Finding 6.

As Joe pointed out if there are any questions as I am going along please just stop me in my tracks and we can discuss any of these points.

Finding 7 gets into the term effectively monitored. This was introduced in RPRT-0092 and it's essentially, even if you were not monitored on a particular job or associated with a particular job, if you were on the same job plan with someone who was monitored then you could consider it that the co-exposure model is representative of that exposure because the worker was not monitored but you can apply the co-exposure model based on workers who were doing the same thing at the same time.

We do have a little bit of a differing of opinion on what the entails, but we'll get into that in a second. But Finding 7 reads that total effectively monitored population, which, again, is those who were directly monitored via urinalysis or in vivo, and those who are on the same job plan who would be included in the co-exposure model essentially covering those unmonitored workers. So the effectively monitored population for americium during the 1980 to 1989 period is about 33 percent.

In SC&A's look at the data we had 20 percent who were directly monitored and then another 13 percent who are essentially covered by someone who was monitored via urinalysis and those results would hypothetically be used in the co-exposure model.

And, in fact, with americium that's true because I believe NIOSH coded all of that data so it's not just a sub-sample of NOCTS for americium specifically. For some of the other nuclides I believe it's basically the

available NOCTS data, not the full population.

So moving on, just to summarize what we see as NIOSH's response, and, again, this is where I guess the differing of opinion is, NIOSH believes that the effectively monitored population should be 56 percent, not 33 percent.

And that is based on, again, we agree only 20 percent were directly monitored within a given timeframe and 36 percent were monitored or were covered by a worker who was monitored via urinalysis or in vivo. This is where the differing of opinion comes from.

SC&A feels that to define an effectively monitored population you can only count it if, you know, the unmonitored worker is on a job plan with a monitored worker whose results are actually used in co-exposure modeling.

If those results are not used in a co-exposure model they are not represented, and so essentially they remain unmonitored, not effectively monitored.

They point out that three of 43 subcontractors had the potential for exposure. I do have a little bit of questions about how they reached that number, but, again, this comes directly out of their review which was transmitted in late August.

And, also, subcontractors were monitored for incidents, which we do not dispute. I mean it's a higher level. They had, obviously, there was a contamination found or high air samples or whatever it was that triggered the incident investigation and we agree those subcontractors in that event were monitored.

And then this last bullet here associated with the 1991 data, we originally pointed that out because the 1991 data was not used I the co-exposure model, so we sort of questioned, well, if you're not using that data how can you claim that it's actually representative of those unmonitored workers?

Again, we'll get into that because it seems like NIOSH has agreed and they will be using that data, and it's actually just one bioassay sample from 1991, but it covered a lot of those workers to get to that effectively monitored population.

And, again, SC&A's sort of response to this is if you are going to say "effective monitoring" you should only include the unmonitored workers if that monitored worker on the job plan is actually used in the co-exposure model.

For example, I mean if the samples are not used to build a co-exposure model and assign intakes, which is basically the in vivo monitoring results for americium, then the unmonitored worker is not represented in the co-exposure model.

And so we don't feel that it should be given credit just because they were on a work plan with somebody who had an in vivo sample if that sample is not going to be used.

I know NIOSH will, based on the presentation sent yesterday, I think it sounds like they will be starting to use in vivo monitoring for americium, but we'll get into that I think during NIOSH's presentation.

And, again, regarding this 1991 bioassay sample, the reason we brought that up is because it wasn't used in formulating the co-exposure model as it currently stands.

But NIOSH in its response from back in August/September they are going to add that data and consider it in any co-exposure model estimates.

Finding 8 has to do with fission products. We are in a pretty good lockstep on here. Seventy to 73 percent of the workers who should have been monitored for fission products had the appropriate sampling during the periods evaluated.

And, again, this is the DuPont period, so it's 1972 to 1974, 1980 to 1989. Now you'll notice there is a gap

in there. There were no job plans identified for '75 to '79 available for analysis for either plutonium fission products or, obviously, americium.

Among those 70 to 73 percent almost all of them were monitored via urinalysis. However, the co-exposure model is based on in vivo counting.

So, again, the question is whether when you start to look at that effectively monitored population, that is the directly monitored, you have monitoring results for that worker, or they were on the same job plan as someone who was monitored and that result is included in the co-exposure model.

Essentially what happens is is that 70 to 73 percent remains the same because they were all monitored via urinalysis while the co-exposure model is based on in vivo, so they are not represented in the current co-exposure model.

A summary again of NIOSH's August response. They present essentially figures about how many subcontractors were included in the co-exposure model.

There is a minimum of no subcontractors in '74 and '75 and then it increases substantially to about over 300 in 1990 who are included in the co-exposure model.

Prior to 1982, NIOSH contends that the subcontractors were monitored by a special urinalysis, so that would essentially be mostly incident-based, I believe.

I mean there would be some situation in which a subcontractor was identified and sent, you know, over to medical to submit their sample.

And that prime construction tradeworkers performed similar work to bound exposures to subCTWs, which is really essentially the entire question that RPRT-0092 is set up to answer.

They note that whole body counts were considered valid up to three years from the date of the job plan. And as I said before based on the internal procedures it's two years. It says it right there in TIB-60 that periods longer than two years for fission products are considered unmonitored.

And we agree that 70 to 73 percent of those workers, and, again, this is strictly for fission products, underwent the appropriate monitoring to be able to bound their intakes. So that's the number for that one.

I guess, and our response to this is, again, we want to point out that there is no job plans for '75 to '79 so there is a gap there where we can't say anything about it.

In the original sampling plan it was actually stated in there that NIOSH would only consider any sort of bioassay as being associated with a job plan if it was conducted within one year of the job plan. That goalpost moved a little bit.

And, again, this two years versus three years, again, now we're sort of expanding the approach again. Again, we trust in that procedure, internal dose reconstruction, which was written by NIOSH and governs their program, that two years is the acceptable timeframe to be considered monitored rather than three years.

And, again, the co-exposure model, formerly the coworker model, none of the workers identified in the '72 to '74 timeframe were monitored via in vivo. It was all in vitro, urinalysis data. Only 4 percent had monitoring via in vivo in '80 to '89 and that is how you would establish that the unmonitored workers are actually represented in the coworker model.

We agree on the percentage of directly monitored workers, again you're in that 70 to 73 percent range, but we disagree on the effectively monitored workers for the reasons I just stated. They are not monitored via in vivo and in vivo is what is used to develop the

co-exposure intakes.

So moving on to Finding 9, and this is the big one, I guess. SC&A does not find that the data collected as part of the RPRT-0092 review support the premise that subcontractors on job plans that should have required internal monitoring for americium were either directly monitored, around 20 percent, NIOSH and SC&A agree on this, or alternately appropriately represented in the derived coworker models for SRS. And, again, coworker is the antiquated term, the correct term is co-exposure now, but since that is the way it is worded in the original finding we kept it here for that.

And as far as those who are represented, the unmonitored workers represented in the co-exposure models, that's an additional 13 percent which gets you up to about 33 percent.

To summarize again what we see as NIOSH's response based on the response paper from August, most of the americium exposures were commingled with plutonium. Additionally, NIOSH provided 11 examples of incidents involving subcontractor workers where there was follow up monitoring. SC&A does not dispute that.

And that NIOSH believes that the effectively monitored population should be 56 percent, not 33 percent, and that 56 percent actually comes from SC&A's analysis and it includes those workers who were monitored via in vivo for americium, which again is not currently used in any sort of co-exposure calculation.

So when SC&A calculated the 33 percent we didn't count an unmonitored worker as effectively monitored unless they were on the same job plan as a monitored worker via urinalysis, which is used in the co-exposure model.

So we acknowledge that the majority of the americium exposures would likely also involve plutonium that is commingled with it. It's a

parent/daughter relationship there. We also acknowledge that the incident-driven bioassay did occur.

We point out that the examples provided in the August response were limited to the 1980s and I'm not sure how much I can say about this because our response paper has not yet cleared ADC.

But for those of you who have the "Official Use Only" copy you can look at our description of Example 1 and it points out several issues with the institutional controls that were in place at the time.

So, again, I don't think I can really speak to that on this public call at this time, but I would point to the Work Group Members again to that description of the first incident example and hopefully you'll see what I am talking about there.

Anyway, even though a lot of the americium was commingled with plutonium it doesn't answer the question of when you have separated americium, as occurred in the F-Wing. And, again, those are the only job plans that were analyzed in this evaluation and there were none for the Multi-Purpose Processing Facility.

And, again, we feel that when you establish the effectively monitored population, that's the directly monitored, they actually submitted a sample, were counted in vivo, plus those unmonitored workers who were on the same job plan as somebody who is included in the co-exposure model, we believe that the correct number is 33 percent effectively monitored, at least at this time.

And, again, just perusing through NIOSH's presentation sent late yesterday it seems that maybe that co-exposure model might be modified, so we'll certainly talk about that later today.

Again, our responses, we don't feel that RPRT-0092 actually accomplished its goal, at least for americium-241. Now, again, SC&A believes that for

americium only 33 percent were effectively monitored.

NIOSH contends that it is 56 percent, which doesn't necessarily strike me as a great number either, but this comes down to a policy decision on what is acceptable, how complete is complete.

Moving on, Observation 2. For the '72 to '74 period we only had one job plan and worker combination for americium exposure. We noted that in the original RPRT-0092, however, it indicated that two job plans were applicable for this period, and this is really an easy one.

NIOSH responded that, you know, that second job plan really should not have been, or the report should not have indicated that the second job plan was to be assessed for separated americium monitoring because it did not take place in the F-Wing, so it just should not have indicated that, and we agree with that clarification.

Again, it's an observation. We would recommend that it be closed and, again, just to sort of remind the Work Groups that there was only one single job plan available for evaluation from '72 to '74 and there were no job plans available for the evaluation from '75 to '81, or '80. There was job plans from '81 to '87 only.

And this gets back to, again, what is the effectively monitored population and what we point out here, again, is that a lot of the matches made for the effectively monitored population were based on a worker who was sampled in 1991.

The worker was in a different area and was involved in an incident there. At the time of our review that data was not included in any sort of co-exposure model so we didn't think that credit should be given for that.

But, again, a summary of NIOSH's response is that the intent of the report was to just assess if

unmonitored workers worked in the same environment as monitored workers.

SC&A feels that, again, the monitored workers have to be part of a co-exposure model to consider it representative and, again, this is a point of contention that will be discussed thoroughly if not through this presentation but certainly through NIOSH's response presentation.

NIOSH contends that the 1991 sample does reflect exposure potential for all the job plans that that worker was involved in. We don't dispute that.

NIOSH has agreed that that 1991 sample would be incorporated in any future revision of the co-exposure model. So that would essentially take care of this observation anyway.

Again, just to reiterate, when we are trying to get percentages here of the effectively monitored how many workers are actually covered by either direct monitoring or the co-exposure model that's the point of contention.

And, again, SC&A believes that representation is only established when your monitored worker is actually used in a co-exposure model so that when you have the unmonitored worker on that same job plan you can say they are represented by the person standing next to them, for lack of a better characterization.

Now we agree that '91 sample does reflect the exposure potential to any job that person was involved in and NIOSH agreed to include that sample in any future co-exposure analysis and evaluation, so SC&A recommends that that observation also be closed by the Work Group.

Okay, that kind of sums up the DuPont era analysis. And, again, there is some gray area with 1990 that Ron Buchanan will get into.

I guess at this point before turning it over to Ron are there any questions at this point or should we just

proceed ahead?

(No audible response.)

Mr. Barton: Well, hearing none, Ron, do we got you on the line?

Dr. Buchanan: I think so. I hope so. Can you hear me?

Mr. Barton: I can hear you. Alright.

Dr. Buchanan: Okay. This is Ron Buchanan with SC&A and I am going to be briefly talking about the Westinghouse Era and we will cover Findings 10 and 11 and then Observations 4 and 5. And so, again, feel free to ask questions as we go along if you have any.

So Finding 10 we were concerned that the RWP data for 1990 was lacking and, therefore, and as Joe has alluded to this previously, that the 1990 should be included with the limited data era of '72 to '89 and not bundled with the year 1991. Next slide.

Now we understand NIOSH's response is that they believe that 88 percent direct monitoring for subcontractors is just not incomplete and the results of the NOCTS data indicate that 89 percent of the subcontractors who were claimants in 1990 had some form of internal monitoring data and that Savannah River continued monitoring all site workers during the changeover in contractors. Next slide.

Now our response is that, first of all I would like to put in the note that RPRT-0094 was issued just before we issued our response to 0099 last year and in that report it showed that about 89 percent of the subcontractors were bioassayed in 1990 and that that was similar to the percentage that was bioassayed during the following periods of the '90s.

However, we reviewed RPRT-0094 and we agree with that. However, what we are talking about in 1990 was not the number of bioassays but the RWPs that specified what radionuclides should be bioassayed

for, and so the number of bioassays doesn't necessarily substitute for the number of RWPs, which would give specific radionuclides. Next slide, please.

And we look at this, NIOSH's response, and we see that the 88 percent NIOSH quotes covers the entire period of 1990 to 1998, not just the year of concern of 1990 to present, and addresses the number of bioassays, not the number of RWPs.

And so we feel that bundling that '90 and '91 indicates that that there is a lack of RWP information for 1990 and/or with '91 and it is 1990 that lacks.

There was only one RWP that had one worker on it.

(Off microphone comment.)

Dr. Buchanan: Pardon?

Participant: Okay.

(Off microphone comment.)

Dr. Buchanan: Okay. So that was Finding 10 and this is Finding 11. We feel that overall for --

(Simultaneous speaking.)

Dr. Roberts: Hello? I am hearing someone speak in the background. Please mute your phone.

Dr. Buchanan: Okay. Okay, we feel that for both periods that when you consider whether the contractor was monitored or not you have to look at all of the radionuclides being monitored.

Now that was the original intent, I understood, of RPRT-0092 and then it went to the at least one radionuclide monitored.

In other words, if there was an RWP that specified you had to have strontium and plutonium then my opinion is that you should have to have bioassay results for strontium and plutonium, not just for strontium or plutonium, because this would not

represent that the person was strictly monitored for what was required under the conditions of the RWP.

And so if you analyze the data, Bob Burton analyzed the earlier period, I analyzed the later period, and we found that the percentage of the directly monitored workers we found ranged from 47 to 77, whereas RPRT-0092 where they only use at least one radionuclide be monitored ranged from 76 to 96, so there is quite a bit of difference there, about a 20 percent different.

And the effective monitor, if you include the coworker that might have been with the worker and he was monitored then we calculate 55 to 89 percent and RPRT-0092 has 85 to 99 percent. Again, quite a bit of difference in what appears to be the monitoring rate.

Okay, so we understand NIOSH's response says that originally that was true, all of them were supposed to be monitored, however, RPRT-0092 only used at least one.

And so NIOSH believes that the data given in the report shows that the subcontractors were monitored similar to other workers and that unmonitored subcontractors worked in the environment as the monitored workers. Next slide.

Dr. Roberts: Sorry, Ron. It sounds like somebody is speaking in the background and they are probably not going to hear me to mute.

Dr. Taulbee: It's whoever is calling User 1.

Dr. Roberts: Yes. I've written -- Nancy or Zaida, are you still on the line?

Ms. Adams: Yes. I'll try to --

Ms. Burgos: Yes, we'll do it.

Dr. Roberts: Okay. Thank you.

(Pause.)

Dr. Roberts: Sorry, Ron.

Dr. Buchanan: Yes, it's okay. Okay. I think you may be okay to keep going.

Dr. Buchanan: Okay. Okay, we're on Finding 11 now, Slide 48. Additionally, SC&A understands that NIOSH stand by the results given for the effectively monitored workers by using the one bioassay only and even without the effective monitoring that they have plenty of data to create a coworker model.

Okay, so we can move to Slide 49 now. Okay, so from our analysis we, again, we think that using just at least one bioassay should not be used to indicate that a worker was adequately bioassayed as specified by a job plan or RWP. At most it's a crude indication that the worker was bioassayed but not necessarily specific to the requirements of the job plan and because, again, a worker could have been on routine uranium analysis but then required by a job plan to have plutonium analysis and the uranium wouldn't count for the plutonium bioassay.

In addition, when that subcontractor worker's data comes up for dose reconstruction that person would only be assigned uranium dose and probably not plutonium dose unless there was special circumstances that indicated that he needed to do that because they were not in the worker's file that he is monitored for plutonium. Okay, next slide.

Okay. So we feel that there is a severe limitation to using just at least one bioassay when weighing the adequacy of the internal monitoring data.

So the Work Group should be aware of that fact and that the original intent of RPRT-0092 was to determine if subcontractors were monitored similar to other workers and not that if they had some bioassay but if they had complete bioassay.

So I'll move to the next one. Okay, that was Finding 11. And so now we have two observations.

Observation 4. This was the -- We have been debating this a while, and that is that when you do use the effective monitored data to say that a worker was monitored, a sub was monitored, you have to be very careful of what you include because there is a lot of criteria that needs to be met.

One of our suggestions was same crafts so it would be the same exposure. However, there has been some debate over that. Now we all agree that it should be the same date and the same time that the work was performed and, also, on the same RWP.

Now we understand that NIOSH says that when they compare the plutonium bioassay datas for the '90s there is no significant difference in the crafts and that they consider the following criterias listed there on the slide, the RWPs, the working conditions, similar times, and not the same crafts, but similar environment. Next slide, please.

And so NIOSH found that they had the same amount of bioassays over the crafts, but this doesn't really, this just indicates the frequency of bioassay, not necessarily that it had similar exposures as an RWP would point out.

And so SC&A now when we did look at this effectively monitored group we found that if we looked at the plutonium data in Table C-3 of RPRT-0092 we found about 25 percent of the sign-in dates didn't match for the co-exposure method that was used.

So I mainly want to point out that there is some fallacies that can take place in there because it's quite a detailed process. So, next slide.

So this observation was mainly to point out the caution to the Work Group that you have to very careful when matching up coworkers to the subs to say that they were effectively monitored.

I think we discussed this, and I don't think there is going to be enough data to separate out by the crafts, and so what we want to do with this observation is to

make the Work Group aware that the effective monitor's percentage has to be taken with a grain of caution and that we recommend closure of this observation by the Work Group in the SEC Issue Work Group at this point. So it was an observation to point out a point.

So that brings us to Observation 5 and that is probably the crux of the whole 1990 issues is, as Joe has alluded to, that the 1990s did see some improvement. However, we feel that this wasn't a step function when the new contractor took over. It wasn't the instantaneous change as you can imagine in a huge organization like this. It took a while to get it identified and in place and effective.

And so we see that, as I pointed out before, 1990 only had one RWP with one subcontractor listed in it. So it took a while to get things in place.

As NIOSH has also agreed that the specific radionuclides were not required on the RWP in a consistent manner until about the 1990s, about the mid-1990s, '94-'95 timeframe. So next slide, please.

Now we understand NIOSH does not think that any of this is consequential to the operation of the Routine Bioassay Program or dose reconstruction.

While it is true that radionuclides were not specified in the early RWPs until about 1994, however, NIOSH has used other information and documentation and information on RWPs to give some indication of the target radionuclides.

And even though the radionuclide of interest was not documented on the RWP this doesn't mean that the subcontractor did not have a bioassay taken. Next slide, please.

So we respond to this to say that while the number of bioassays is an indication of the data available, which is not necessarily an indication that the subcontractor was monitored for the correct radionuclides while working in the same environment

as the other workers, this, of course, was the issue that initiated RPRT-0092's analysis of the job plans and the RWPs to begin with. Next slide, please.

And so now we know that NIOSH assumed basic assumptions as outlined on Page 31 of RPRT-0092, and that is that they looked at air monitoring requirements, bioassay requirements, on similar RWPs in the areas, bioassay guidelines and other documentation to fill in what they thought was needed.

Now I would like to clarify that there is tables in RPRT-0092 in the back, the C-1, 2, 3 and 4, et cetera. They have assumed and required bioassays for certain radionuclides and a lot of when you are even talking about directly monitored subcontractors when that figure says you have 70 percent were directly monitored, 20 percent were effectively monitored, NIOSH gave you 90 percent overall.

Well, even on a directly monitored those requirements were combined. If a person needed a certain radionuclide that was determined by if it was specified on the RWP, which it wasn't much in the early days, even in the early '90s, and assumed, you'll see an R and an A, and R was accurately written down and A is assumed, which means that NIOSH went back using these criterias and said, yes, plutonium should have been a candidate that might have needed monitored during this specific instance.

And so you have some judgment call there, but you don't have direct linkage between the RWP and the isotope that was assumed to be monitored or needed monitored, even indirect, and then you supplement that with effective monitoring which increases the percentage some if you assume that the coworker and the sub was exposed to the same intake and then that coworker was monitored.

So there is a number of assumptions being made in even the direct monitoring. And so we feel that the early 1990s is still a question on how accurate some of these subs were monitored. Next slide, okay.

And, of course, you couple that, the fact that the RWPs weren't specific until the mid-1990s and then you get concern also that there were still issues in 1997 of workers not leaving bioassays, and this was more specific to the RWPs overall.

For example, in 1997 where you had the 3200 cases and there was only like 160 that didn't leave samples, but that was RWP people which could include a lot of subs. And so you have that area of concern and you have your DOE Occurrence Report in 1998 that indicated that there was job-specific bioassay issues repetitive back first identified in '95. And so that is a reason that we analyzed the 1990 data in some detail and while we didn't find some of the big gaps in the lack of facility coverage, we had more facility coverage and we had information with RWPs, especially in the latter part of the '90s, we still have some concerns.

So to summarize it, go to the next slide. We have two issues still and that is that there is a limitation on what the one bioassay concept can cover and that we should consider heavily how that weighs in on the accuracy of the internal monitoring data and that doesn't necessarily satisfy all the internal monitoring requirements or indicate adequate internal monitoring. Next slide, please.

And so we have some incomplete RWPs, that's probably one of the main cruxes of the 1990s, is that there was marked improvements with the introduction of RWPs in the early '90s but they did not begin to consistently specifying radionuclides until around the mid-1990s and that filling in the earlier requirements for the RWPs through later information has its limitation.

And as we have seen this was done also for the DuPont area and we feel that this even for the '90s it has its drawbacks because there is not a direct linkage between the RWP and the bioassay requirements.

Okay, so that concludes my part on the 1990s. If

there is no questions I will turn it over to Joe to sum up the 1972 to '90 era.

Mr. Fitzgerald: Any questions for Ron?

(No audible response.)

Mr. Fitzgerald: Okay. Just to wrap things up from our standpoint, again, this embodies the NIOSH August response in addition to what was said last December.

You know, we split our conclusions for the DuPont versus the post-'90 era. For '72 to '90 we continue to conclude that NIOSH has been unable to demonstrate, and this is using the stated evaluation criteria in RPRT-0092, to demonstrate the completeness of subcontractor job-specific bioassay data and it did not accomplish the objectives for determining completeness that was in the sampling plan that was the basis for the analysis.

Our second point, and this was covered by Bob, is that the limited analysis of the americium by time period, for '73, '81 through '87, and for the fact it was only one location, F-Wing of 773-A, showed limited associated monitoring to conclude that, in fact, the co-exposure models are truly representative of the workers on the job-specific bioassay program.

And, finally, it remains unknown from our standpoint to what extent past job-specific bioassays are incomplete. I mean that was the central question three years ago.

But it is known that the gap in '97 that was the driver behind this review, it was significant, and we believe that the weight of evidence that we have provided at least invalidates the inclusion of the pre-'91 subcontractor data as sufficiently complete and representative for use in the coworker model, or the co-exposure model, I'm sorry. So those are the three touchpoints for '72 to '90.

Okay, for '91 to '98 the so-called gray area, which Ron just covered, as he noted we conclude that the

subcontractor job-specific bioassay completeness we believe can be established. There is certainly enough information, whether it's RWPs or bioassays, I mean certainly the amount of information becomes much greater, a lot of it derived from the fact that Westinghouse put in place procedures and programs that, you know, provided more accountability and required, in fact, more specific bioassays.

However, the big qualification and where we call it the gray area is we are not clear still where that step function is after 1990 because, again, that was a period where new procedures, new practices, even a formal RWP program was being stood up at the site, so the question is -- and this question goes back to the fact that, you know, the whole issue with notice of violation and the self-assessment that Westinghouse performed was that, you know, a large percentage of the job-specific bioassays were missing or lacking for 1998 and there was no clear idea of whether that condition pre-existed '97, '98 -- or, I'm sorry, '96, '97.

I think the information is much more comprehensive now, but we are still not very clear on whether that point of completeness and representedness is 1990, '91, '92, certainly it suggests that it might be in that very early '90 timeframe, but for the reasons that Ron covered we are still concerned about that.

I want to conclude by reading into the record something that actually is in our executive summary. It's the last paragraph of our executive summary.

NIOSH emphasizes in its recent review, and this is the August review -- I'm sorry, no, it's the recent review of RPRT-0091, which is the report we are going to discuss next, but there was a very relevant citation in there.

The citation is that "A small amount of missing routine or job-specific bioassay samples did not invalidate the Radiation Protection Program at Savannah River and do not automatically invalidate the vast amounts of available monitoring data to

generate a coworker model." That's the very central quote from RPRT-0091.

But, you know, from our standpoint, and I think we have touched on this today, we think this misses the point of the RPRT-0092 analysis.

As pointed out in SC&A's 2017 review, going back three years ago, subcontractors are not merely another worker category. They were often transient, performed a variety of work across the site, and they were often assigned the higher exposure jobs making it imperative to demonstrate that their internal intake data are sufficiently complete and bounded by the co-exposure model.

From our standpoint it remains unknown to what extent job-specific bioassays are incomplete, but what is known is that the gap in 1997 was significant.

SC&A concludes that the weight of evidence provided by SC&A's review of RPRT-0092 invalidates the inclusion of those data's complete and representation in the SRS co-exposure model for at least the 1972 to 1990 timeframe, the DuPont era.

So that's kind of our bottom line at this point. I would add that quite apart from the difficulties with the unavailability of records and, you know, permits and job-specific bioassays, the design of RPRT-0092, the analysis that was designed and the evaluation objectives, I thought were very relevant and corresponded to the requirements of IG-006 in terms of directly establishing the completeness and assessing the representativeness.

So no fault with the design, it's just the execution because of the lack of records and the assumptions that then had to be made I think undercut the results that were achieved.

I don't think we still have a valid basis to judge that the completeness of job-specific bioassays for subcontractors prior to '96, '97, were, in fact, dramatically better, and particularly for the '72 to '90

timeframe.

So that's pretty much it from our standpoint. Rashaun, do you want to -- well, first let me say since we kind of did a wrap up, are there any questions from the Work Group for any of us on the response?

Chair Clawson: This is Brad. Joe, I don't have any at this time. Does any other Members of the Work Group have any questions?

Chair Anderson: No, I do not on my behalf. This is Andy.

Mr. Fitzgerald: Okay. And we did cover this in some detail last winter.

Chair Anderson: Yes.

Mr. Fitzgerald: So it's a recap.

Chair Anderson: It's a good update, but that's --

Mr. Fitzgerald: It was a year ago, so I guess it was worthwhile.

Chair Anderson: Yes.

Mr. Fitzgerald: Rashaun, do you want to take a break or what's your direction?

Dr. Roberts: Let me defer. Brad, what is your feeling about that? Do you think a comfort break is in order?

Chair Clawson: Yes, that would be nice.

Dr. Roberts: Okay. How long of a break is reasonable? It's about, it's just a little bit before 12:30, so when shall we reconvene?

Chair Clawson: Ten minutes. Ten minutes would be fine with me.

Dr. Roberts: Ten minutes. Is that sufficient for people?

Chair Clawson: Voice your opinion if it isn't enough.

Member Ziemer: Good for me. Ziemer.

Dr. Roberts: Okay. So we will be back at let's call it 12:40.

Chair Clawson: Okay, sounds good.

Dr. Roberts: All right. Thank you.

(Whereupon, the above-entitled matter went off the record at 12:28 p.m. and resumed at 12:40 p.m.)

Dr. Roberts: So, my clock is showing 12:40. So, the court reporter is back on the line. And let's do a quick roll call to make sure that Working Group Members are back.

So, Brad, are you back on the line yet?

Chair Clawson: Yes, I'm back.

Dr. Roberts: Great.

Lockey?

Member Lockey: Yes, I'm back.

Dr. Roberts: And did David Richardson, by chance, join us?

(No response.)

Okay. I don't hear anything.

Schofield?

Member Schofield: Yes, I'm back.

Dr. Roberts: Okay. Anderson? Andy, are you back?

(No response.)

Okay. I don't hear anything.

Josie, are you back? I think I see you.

Member Beach: Yes, I'm back.

Dr. Roberts: Okay. Gen?

Member Roessler: I'm here.

Dr. Roberts: Good.

And Ziemer, Paul?

Member Ziemer: Yes, I'm back.

Dr. Roberts: Okay. Great.

Chair Anderson: I'm here. I'm sorry, I was on mute.

Dr. Roberts: Great. I thought so. Okay.

Chair Anderson: My screen went black.

(Laughter.)

Dr. Roberts: Okay. Well, it looks like everybody's back.

I would just like to send a reminder, though, to just make sure. Sometimes the Zoom or your phone can come off mute. So, if you could just periodically check and make sure that you're completely muted as others are speaking. It's been a little bit of a rocky morning. So, if you could just make sure that you're muted.

Great. So, thank you.

And let me hand it back to you, Brad.

b. NIOSH Presentation

Chair Clawson: Thank you. Okay. Well, we've heard from SC&A. And so, the next one is the NIOSH presentation. I believe you'll be doing that, John?

Dr. Cardarelli: Yes, I will.

Chair Clawson: Okay.

Dr. Cardarelli: So, I need to share my screen here. And bring this one over. Okay. I'm not sure that's the right one to be seen. Uh-oh, I'm having difficulty

getting the screen because it just went black. Oh, there we go. All right. Can everyone see that now? I can't see anybody, but --

Member Ziemer: I'm not seeing it, John. Nothing yet.

Dr. Cardarelli: Okay. It's coming up on my screen. Let me try something else. My apologies.

Member Ziemer: Do you have screen-share privileges from your computer?

Dr. Cardarelli: I am going to try to start over here because I can't seem to get my Zoom to work right.

Dr. Taulbee: John, if you want, I can try to share.

Dr. Cardarelli: Yeah, if you want to do that. For some reason, it's gone to all different screens on my computer here. And I'm trying to move the screens around. Here we go. Share screen and this presentation.

Dr. Taulbee: There, you've got it.

Member Ziemer: Now we have it.

Dr. Cardarelli: Great.

I might look off to my right a little bit because my monitor is there and that's where I can see, and then, I can see the video on my left when I look into the camera here, just to orient folks here.

Now you should only see just the whole picture. Is that correct?

Dr. Taulbee: Yes.

Dr. Cardarelli: Okay. Perfect.

All right. First of all, I want to thank everyone. This is the first time I get to present in front of the SRS Workgroup. I joined NIOSH about a year ago, and I've been spending the last year getting myself slowly brought up to speed in reading many, many years of transcripts and reports and trying to get myself to the

point where I can present this information competently to you, and I am hoping I am there.

And I, first, want to say something to Mr. Clawson and the Workgroup, that the material that I'll be presenting here, the actual report was sent to the Workgroup on September 2nd of this year. The PowerPoint presentation that was mentioned earlier was sent to the Workgroup yesterday, and that was due to the fact that there are slides in this particular presentation that needed to go through classification review and there was a delay in getting that back in time. So, my apologies on that.

Chair Clawson: I understand, John, and I appreciate that.

Dr. Cardarelli: No problem. Thank you very much.

I'd also like to thank SC&A for giving a two-hour recap of the material. It came as a little bit of a surprise because what they really presented was material that we received on November 5th, which is great. It's just that we -- the good news is my presentation probably will be substantially shorter because it's partially been presented. The bad news is we may not have all of our responses to have a full discussion and may need to take some time to digest what we received a few weeks ago. But I think we can make some good progress today.

And I especially appreciate the SC&A's recommendations to close out Observations 2, 3, and 4. So, that will certainly cut off some of our discussion there.

What I wanted to get started with is the fact that the primary authors of this particular work were Mike Mahathy, who's the health physics lead at the Savannah River Site, and Roger Halsey. I worked closely with them over the past several months to prepare this, and I may rely on them to speak up, or Tim, to correct me if I happen to get a specific detail wrong. So, I ask for a little bit of support there as we present this information.

Let me see. We should go to the next slide. Okay. I'm going to redo my images. Okay.

As pointed out earlier, the background of this whole work was simply to determine the question of unmonitored workers working in the same environment as monitored workers, and I'll even add the caveat at the same time. That was mentioned in the previous presentation.

So, the Workgroup asked NIOSH to obtain more information, and we thought at the time that special work permits, radiation work permits, and job plans, would be able to answer this question with the fidelity necessary to address that question.

So, we went after and gathered a whole bunch of information. And, you know, if we can actually do this, then the ultimate resolution would be the use of coworker exposure models would be applicable for dose reconstructions. If they aren't, then a different approach might be needed.

So, at the out-front, it's our preference that we do not stratify subcontractors from the contractor trades population. I think that's kind of an underlying assumption that we would like to put forward there.

What was discussed is kind of presented in this image. It's a timeline from 1950 through 1998, but it shows where the SEC Class 103 ranges from 1953 to about 1972. The ORAUT-RPRT-0092 starts in 1972 and progresses through about 1998. And then, I've shown in here when there's a change in the major contractor, the DuPont era and the Westinghouse era. And then, in the report we separate that further into Mid DuPont and Late DuPont, as you can see there, separating around 1979 to 1980.

So, to save us some time, I put up the finding here, and I guess I'll go ahead and read it into the record. No SWPs or job plans sampled by NIOSH for 1972 to 1990 contained any requirements for indications for job-specific bioassays, despite respiratory protection being required, bringing into question the approach

taken to satisfy RPRT-0092's first evaluation objective, which was to determine the fraction of subcontractor trade workers identified on RWPs of interest who were monitored for internal intakes.

So, what does this get to? It's the finding questions, the completeness of the dataset for subcontractor trades during the DuPont era.

Well, our response is, basically, summarized earlier, that we contend that, even though the bioassay choice may neither have been checked nor entered in the standard work permits and job plans, there was plenty of or an ample number of bioassays taken after respiratory work was conducted to verify workplaces.

So, RPRT-0092 used the era-specific criteria to determine if bioassays should be taken for the '72 period. And I think that's really important. We're basing determinations on what was done at the time that a routine bioassay program was in place. We should not necessarily be applying what was done during the Westinghouse era and expect the same level of fidelity in the DuPont era. They were absolutely different operating philosophies, different management approaches and procedures. That's been acknowledged during previous, past Working Group meetings. So, I think it's a little bit we have to be cautious when we compare these two and try to say, well, it's not complete because it didn't meet the criteria that Westinghouse met and we like that criteria.

I think this was an interesting quote that I found in one of the transcripts back in February 9th of 2019, and SC&A made this comment. DuPont handled the subs pretty similar to how they handled the in-house workers.

So, you could go to that particular transcript, read the context, but, in essence, the main message here is, even folks back then recognized that the subcontractors were not treated super special and they don't have something radically different or

unique which might require them to be further substratified from the construction trade workers.

Going back to an image, I've tried to bring the big picture. We've talked about bioassay control procedures. We've talked about job plans. We've talked about radiation work permits, when certain things started and ended. This is just one slide with a graphical image that gives of us an idea of when the bioassay control procedures took place.

And I think it's really important to note that, during the DuPont era, think of this as more of a production era, and the Westinghouse era is more of a transition from production to environmental cleanup and other activities. And that really starts to take off after the 1998 period.

So, one thing is very stable when you're in production and things begin to vary a little bit when you're moving away from a normal production era. But there's an evolution that also goes on with regard to the routine monitoring, why it was done, how it was done. And what we'll see throughout this presentation, it's remained relatively constant over time. And I think that's an important talking point that we can discuss later.

So, Finding 2: Radionuclides of interest assumed for sample permits in RPRT-0092 are of questionable accuracy, given the cited lack of adequate radiological source term characterization prior to 1990.

Well, we believe that, prior to this, the radiological source terms at SRS were adequately characterized with sufficient accuracy for dose reconstruction purposes. And there's significant evidence that SRS characterized the radiation work environments in multiple ways, and we talked about that. And these are just some examples:

The SRS maintained inventories of radioactive materials.

We have isotope production records with quantities and locations.

We have transuranic radionuclides and enriched uranium controlled as special nuclear materials.

Monthly technical reports from 1953 through 1989. These are very detailed. It tells us exactly where the radionuclides are, their amounts, quantities, things of this nature, which are necessary to understand when you design a health physics radiation protection program.

Not only did we do that, or did SRS do that, SRS monitored the routine and non-routine work by a variety of air monitoring, engineering controls, and things that we've mentioned in our report.

I think what you'll see, too, there's an example in here where a contamination incident occurred which triggered a series of bioassays. And I'll get into that, because bioassays are done above and beyond the requirement by the site and by the orders, DOE orders at the time. They had a policy in place that no worker would be exposed. The bioassay is merely the last line of defense for which we would try to understand, to ensure that all of the other air monitoring, surface monitoring, personnel monitoring are all being done adequately to protect the workers.

One example is this particular table here. And I want to bring out that these are not all the buildings and facilities, just a handful to fit on the slide. But we have four areas or four time periods: 1971, '77, 1985, and 1998.

And as you go across a particular building, say the 221-H Canyon, you can see that the radionuclide of interest was plutonium, fission products, and uranium. And that was what the bioassay routine -- and that's important here, routine bioassay. Keep in mind, that doesn't mean they didn't measure for other things if it was a special, because, through time, if it became a special or if you were involved in

an incident, they would often go back and do alpha spec or gamma spec to specifically identify the radionuclide that would be the biggest contributor to dose in those samples.

The message here, though, is it's generally consistent throughout time. And these were based not on some large-scale Farrell and Findley operation in the '90s. It was based upon knowledge process, where the radionuclides were, experience from the 40 years of operating the facility. So, people pretty much knew what was a stable work environment -- and these are the isotopes that contributed at least 90 percent of the occupational dose. So, we've captured the majority of most workers' exposures just in this routine program, again, which was only designed to verify that all of the other health physics practices were operating properly.

So, Finding 3: the scope of the permit sampling for 1972 to 1990 at SRS is essentially limited to one facility, 773-A, falling short of achieving NIOSH's sampling objective and the representativeness called for in the NIOSH coworker or co-exposure guideline.

So, again, this finding challenges the completeness of the data for subcontractor trade workers, primarily between 1972 and 1979, since only special work permits or job plans were found for 773-A. Well, we believe that the subcontractors were adequately monitored in areas outside 773-A between '72 and '79. Additional reviews of plutonium logbooks support this representativeness called for in the Co-Exposure Implementation Guide.

I was part of a coding process with Mike, and we reviewed over 10,000 pages of plutonium logbooks from 1972 to 1990. And we looked specifically for subcontractor trade workers to get a better understanding of the areas and the volume, or the amount of subcontractor trades that worked at the site over time.

What we found was that there was over 11,300 bioassay samples, over that amount, because we did

not code the same person if they were on a single page and had five bioassays. We were merely interested that a subcontractor trade worker left a bioassay sample on this particular day, and that's what we've really captured. If he left five, we wouldn't count that as five separate individual records because the question of the coding was: do we monitor subcontractor trades and where did they work? And this was a way of capturing that in the most efficient way we could.

So, we identified 7,000 unique subcontractor trades and at least 23 areas at the site. One thing I'll point out, when Joe was presenting his information, he was suggesting that there was over 30 particular areas at the site. The data did not support something of that large of magnitude of potential areas where subcontractor trades would be exposed. The actual bioassay monitoring data, we identified up to 23 sites.

So, here's the data over time. And there's a couple of things that I think that we need to look at here.

First, what's this real low number here in the 1972 to 1978? Well, that's not a period where the subcontractor trades were used. That's just a cultural, procedural thing. The quote here says, prior to 1989, it's still relevant, but, very clearly, you're dealing with less subcontractors, fewer subcontractors in the DuPont Management System, which is a different system. They held themselves close, and the operations were pretty coherent. This was a quote from one of the transcripts in December of 2018 from SC&A.

And the data bears that particular quote out, where we do see less subcontractors, especially in the '70s, until they started using them more in the '80s.

So, the other thing that you'll notice later -- and I'll bring it up -- in 1974 and in 1975, there was some discussion in the last presentation that there were zero subcontractors monitored that was actually using in vivo methods. Okay? But, here, we're seeing

that they are using bioassay. A little bit different, but this is number of bioassays recorded by year for subcontractors only.

What's even more compelling here is where did they work. That's one of the questions: did these people get exposed in the same environment as monitored workers? Well, here we have monitoring data, the 11,000 samples from 7,000 subcontractor workers by area during that '72-to-1990 period. What you'll mainly see is the F and the H areas, where plutonium exposures are mainly found, in the canyon areas, and this was plutonium data.

The CS areas signifies construction trade workers, central shops. And you can see there's a tremendous -- that's practically the second or the third largest volume of bioassay samples. So, anyone who worked through the central shops was being monitored one way or another. Now, radioisotopes, other similarities and issues, we can talk details there.

But I will point out that the C, the reactor area, has 932 samples, where the K and the L and the P are around 224 up to 620. And why would we have more here? And it's simply because this C reactor area, is located very near the central shops. So, when someone were to leave a bioassay sample, it's very easy to put C, thinking central shops, versus just C, reactor. That's our understanding. We think that that's why we have this much larger number here. So, this number is probably larger.

But that's what the data shows and that's what we're seeing. So, these workers are being monitored well outside 773-A and about 20 other locations.

So, SC&A Finding 4: the SRS incident-based special bioassays were provided by workers on a more stringent procedural basis and should not be used to supplement the evaluation of permit-related, job-specific bioassays for 1972 to 1989 as a measure of historic data completeness.

As I note here, this finding points out the difference

between routine and special bioassay procedures, and the latter demanded more attention, and therefore, would likely lead to better follow up completeness. And SC&A suggests that these data will give a false sense of data completeness. And I would not necessarily disagree with that, and I think that they agreed as well. Special bioassays, they're collected for a completely different purpose.

And I think what's interesting in point here -- and this is, again, putting the proper context in the NIOSH response -- the second bullet, actually, the first part of this bullet was in the SC&A presentation. NIOSH contends that incident-based special bioassay sampling was an integral component of the SRS bioassay program for both prime and subs and cannot be disconnected from the routine monitoring program.

And then, the emphasis put on this was for co-exposure modeling completeness -- okay? -- co-exposure modeling and completeness. SC&A put a period right after routine monitoring. It's the application of this data which was really important here, and we're using all data for co-exposure modeling purposes, and it can be applied for completeness in that context.

I think the other thing that's worth noting is that the coworkers are considered to be workers at the same site whose radiation-monitoring measurements are considered to be representative, or -- and the emphasis is placed here -- plausibly bounding of those received by one or more workers with no individual monitoring data.

And what do we mean by that? We simply mean that the plausibly bounding part would necessitate the use of incident-based or special monitoring because those typically occur because an incident occurred or you have higher values found in the results. Those would tend to bound the workers' co-exposure models and give them a higher, a claimant-favorable estimate. So, those are some of the reasons I wanted

to bring out.

The evaluation criteria for data in co-exposures I think, as stated here, in general, three types of monitoring programs have been employed at the site covered under this Act. These programs, listed in hierarchical order of preference for use in coworker models, are the routine, which we've showed data on, the routine measurement of workers with the highest exposure potential, and the collection of samples after the identification of an incident. So, hence, we would want to be including these as part of our co-exposure modeling efforts.

Member Beach: John, this is Josie.

Dr. Cardarelli: Yes?

Member Beach: Oh, go ahead, Brad.

Chair Clawson: No, I'm trying to figure out, are you talking prime subcontractors or are you talking construction trades?

Dr. Cardarelli: I'm sorry, I'm talking construction trade subcontractors.

Chair Clawson: Okay.

Member Beach: My question is the same. Back on slide 15, that was prime contractors with the dose you're talking about or --

Dr. Cardarelli: No, this is subcontractor trades only, construction trade workers.

Member Beach: So, no prime is included in this slide?

Dr. Cardarelli: No prime is -- yes, that's correct. This is not prime. This is only subcontractors, as determined by the payroll ID number.

Member Beach: And I'm talking prime subcontractors, not the construction.

Dr. Cardarelli: Right. These are only subs.

Member Beach: Okay. Thanks.

Dr. Taulbee: Yes, if I can specify, yes, this is just the subs, as John stated. This does not contain any prime construction trades workers, just the subcontractor construction trades workers.

Dr. Cardarelli: Okay?

Chair Clawson: Okay.

Dr. Cardarelli: Okay. I'll get back to where I was.

All right. So, the routine versus incident bioassay. The routine bioassay was used, obviously, I mentioned earlier, to verify and validate workplace controls. Again, the policy of zero exposures was in place and this is a validation effort.

As mentioned in the second bullet, incident special bioassays include positive results, and they are, I mentioned, more bounding, more claimant-favorable.

Rashaun, is this particular Workgroup, is this public? Is the public viewing this?

Dr. Roberts: Yes. Yes, they are viewing it.

Dr. Cardarelli: I've got the wrong version of the PowerPoint which shows personal identifiers. Let me switch out the PowerPoint real quick.

Dr. Roberts: Okay.

Dr. Cardarelli: In fact, while we do that, if there are any questions, I'll prepare the next slide, 10, and my folks, Roger or Mike, will be happy to address some questions.

Mr. Halsey: Are there any questions at this point?

Dr. Taulbee: If I could just elaborate or expand a little bit on what John was presenting with those graphs, SC&A was making the point that we only had data from A area and from '72 to 1990. And that is correct

when you look at it from a job plan and RWP standpoint. And so, that's correct. We did not find other job plans that we could do this with.

But I don't want people to get the impression the workers were -- I'm sorry, this is Tim Taulbee -- but I don't want people to get the impression that there is no monitoring of subcontractor construction trades workers in other areas because there clearly was. And that was one of the things that John and Mike did as they went through the bioassay logbooks and they looked at the plutonium monitoring across, well, throughout the logbooks, and which areas did those subcontractor construction trades workers leave those samples.

And you see the predominance there is F and H area. That's where the plutonium was worked with. So, that's where you would expect more of the subcontractor construction trades workers to be leaving plutonium bioassay. And that bears out that those workers were, in fact, monitored. Even though we don't have the RWPs or job plans to demonstrate it, you can clearly see it by the numbers, that there's thousands of workers monitored in those two areas in that time period.

The third largest is the central shops area. That's the area where construction trades workers would come in from the union halls, get their assignments, and go out to other areas. So, central shops effectively covers all the areas from that standpoint.

And then, you've got the C area there. If you looked on that graph off to the far left, you'll see how small A area is with monitoring for plutonium. Okay? That's where we had the job plans in order to compare.

And, John, if you could go to that particular slide, that would be awesome.

Dr. Cardarelli: Sure.

Dr. Taulbee: I think it's slide 15.

I just wanted to show the scale difference here. We only have the snapshot of the RWPs that we can match whether somebody was monitored or not appropriately for that small area of A area, but the vast majority of the bioassay is in other areas where plutonium was handled, well, handled more, effectively, and where subcontractors would potentially be exposed.

Dr. Cardarelli: Okay.

Dr. Taulbee: We can see your screen now, John.

Dr. Cardarelli: You can see it?

Dr. Taulbee: Yes.

Dr. Cardarelli: Okay.

Dr. Taulbee: You're on slide 4.

Dr. Cardarelli: It should be slide 16.

Dr. Taulbee: No.

Dr. Cardarelli: Oh, okay.

Dr. Taulbee: We're seeing your -- it's opened; it's not in presentation mode.

Dr. Cardarelli: Okay.

Dr. Taulbee: Okay. Now you're on slide 21.

Dr. Cardarelli: Okay.

Dr. Taulbee: Okay.

Dr. Cardarelli: All right.

Dr. Taulbee: If you could go back up to slide 15, I think it was that Josie was asking about, 15 or 16. I don't remember which.

Member Beach: It was 15.

Dr. Taulbee: Okay. Actually, I wanted to show 16, though. Fifteen is just over time. Sixteen is the

composite there.

And you can see the third column from the left is A area. And look at the difference in magnitude between F and H area and A area there. It's just that we only have those RWPs and job plans in this time period for that one single area. But look at the vast majority of the samples. They're out at central shops. They're at F area and H area.

And so, to imply that we can't say anything about the workers being monitored anywhere but the A area I just think is not correct. We do know that workers were monitored from these other areas in large quantities.

Mr. Fitzgerald: Yeah, can I say just one word, interject, please? I was going to wait until the end, but I wanted to say one thing on this point.

Yes, there are certainly a lot of monitoring data points, but in terms of the completeness review that is the purpose of 0092, which is matching permits and jobs to the bioassays, this doesn't speak to that at all. I mean, this is basically a tally of subcontractor monitoring data, whether it's permit-indicated or job-specific. I mean, this is everything. This is routines for these particular sites.

Yes, you have data for other locations, but we knew that three years ago. The question that 0092 is trying to answer is whether, in fact, you can show that the bioassays that were indicated by job plans or SWPs were, in fact, performed, because in 1996-97 a large proportion of those went missing.

So, you know, this is all interesting, but the question is, how relevant is it to the 0092 objective that you went out to achieve? And again, what you've demonstrated is you can look at that complete survey from one facility, which is 773-A. That's the distinction I think needs to be made.

Dr. Cardarelli: Okay. I think that the next few slides might help answer a little bit of that, Joe. I think you

brought up a good point and it's a good segue into why I had to change presentations.

I can't see what you're exactly seeing, but I'm assuming -- am I in presentation mode?

Member Beach: No.

Dr. Cardarelli: Okay.

Dr. Taulbee: We're seeing slide 21.

Dr. Cardarelli: That's where I want to start.

Dr. Taulbee: Okay.

Dr. Cardarelli: Are you seeing other notes or just the slide?

Dr. Taulbee: Other notes. I mean, that is a bunch of notes. It's redacted, though. The name is redacted and the number is redacted.

Dr. Cardarelli: Yes.

Dr. Taulbee: So, yeah, it's probably the one you want.

Dr. Cardarelli: Okay. I wanted to get better fidelity. Let me see if I can just do this. For some reason, my computer -- I'm trying to go to presentation mode, and that's what it does. So, we'll go with this if you can read the information. Okay.

This is an example in 1972 of an incident that occurred, and we found it in a nasal and skin contamination logbook. This is one of those health physics protection measures where, if you're involved in an incident, you would take a nasal or a skin, or whatnot, and it would be sent off for bioassay.

What I want to bring to your attention is, first of all, it's 1972. The very beginning part of this question is, were subcontractors treated differently or were they working in the same environment as primes or others?

What we have is, this is a construction worker, a health physicist, another subcontractor. This is a separations officer, and this is another subcontractor. All right. The top person up here happens to be working with the Wilmington salary group. So, we have five people working.

And the description of the incident is working inside an air tunnel to 294-H, sand-filler, when the air pressure dropped to 90 psig on the manifold that was supplying them fresh air to their plastic suits. All right?

So, here we have an incident. We have two subcontractor trade workers and two normal workers, one being Williams. This is the logbook entry of their nasal contaminations. As you can see, I put their basically identifier of who's the subcontractor trade worker and who is the separations officer here. And you get to see that they have a variety of almost two orders of magnitude difference in the nasal contamination.

So, right now, these workers were involved. They were all working together. They all had to do a nasal swab. And it made it into an entry book in 1972.

This happens to be the plutonium logbook bioassay. It's a different logbook now. And I'm only showing two of the five workers because the first four that are circled in red come from the same person. It happens to be the WS contractor who had the 13,959 dpm contamination of the nasal area.

And then, the one below that was the separations officer, not a subcontractor trade worker. And they had 1400 dpm.

You can see the volume for the urine. We codified them by the PR number, which has been blacked out; the type, which are specials, and then, we have FU, which is follow up. And then, we have another special down here. The area was the H.

The receipt date you see is 8/2. That's the date of the

actual incident. The bottle date, you can see with the follow ups, is 8/2, 3, and 4. And here it's 8/15, but the bottle date is 8/3. So, there's always these lags in the bioassay protocol, where this person left a bioassay sample, but the receipt date for the lab wasn't until 8/15.

Moving on in the plutonium logbooks, we start looking at examples. And this also conveys good information about how difficult it is to interpret these logbooks. This is the WS contractor, and they read his planchette, a dpm per disk, converted it over to dpm per 1.5 liters. What they've reported, which is basically an average of these -- .3, .4, .1 and LIP, lost in process. And then, they have general remarks.

And of course, this person started out with a nasal contamination of 13,595 dpm. And, of course, the person below it, the separations officer, who had a 1400 dpm contamination, got reported less than .1, the reporting level at the time.

Now let's look at the subcontractor trade workers who were involved in this incident. One had a 3500, roughly, dpm nasal contamination, and the other one had a 496. So, they had contamination. You can look at the volume of their urine at the time. The area was the H area, which I copied down from the top of the thing. The receipt date was 8/7. And, of course, the bottle date was when they left the samples the day after here and the day of. They're specials because they were involved in an incident. And that's approximately the time that they left the samples.

The health physicist, who had 4,000, roughly, dpm nasal contamination, you see his volume. He was also in the H area. They received his sample, we believe, on 8/27. And the bottle date was 8/16, several weeks after this incident.

It was a special. So, we're associating this one to that incident. It may not have been because there's been two weeks that has gone by, but that's the way we're interpreting it at this point.

So, what were the results of the subcontractor trade workers? You can see that it's gone through all of the conversions. It's very difficult to read what the report was, but I believe this was less than .01 and the other one was .2. The one who had 3500 dpm got reported less than .1 in the urine, and the one who had the lowest nasal contamination actually got a positive result of .2. And, of course, the health physicist had 4,000 nasal contamination and his report came back as less than .1.

Now there's a couple of things that I think we need to kind of pull back here. The subcontractor trade workers were treated exactly the same as the operator and the WS contractor with regard to providing the bioassay samples. They may have left samples weeks after the incident, but it's all covered under the special program. The special operator was also consistent with the subcontractor trade.

The nasal and surface contamination are not always correlated with the bioassay results. That's probably understandable because there's lots of different ways you can go in and do a smear wipe and do a counting. There could be cross-contamination. Many reasons could explain that. That's why we would look at the bioassay as a gold standard, not the nasal contamination level.

Logbooks are difficult to read and interpret, and are also prone to errors, as you see in the lost in the processing. How would we report that, four individual results for that one person, to combine that together?

And then, nonetheless, all of what we've seen here, this is good data that can be used to develop a co-exposure model. And I think this was probably one of the most important aspects of this whole talk, was to demonstrate in 1972 how the subcontractor trades were being handled. This is long before anything -- RWPs came into place and any other practices that would have required a piece of documentation, like an RWP, that said, on this particular day, I went to leave this and had that. That didn't exist. That was

just a different operating philosophy. But, nonetheless, they were covered.

So, I'm ready to move on to Finding 5, which is, the incompleteness of the SRS dose records for '72 to '90 is substantiated by the acknowledgment of destruction of subcontractor trade records and firsthand worker accounts, coupled with DOE findings of missed occupational radiation dose data from many SRS personnel files, as well as systematic bioassay delinquencies and wide gaps in NIOSH capture of permit documentation.

Well, NIOSH respectfully disagrees with that: dosimetry records were destroyed or lost. SC&A reviewed the RPRT-0092 and they cited inability to readily compile radiation exposure data I think prior to 1990, as well as any key radiation control records, is traceable to a longstanding SRS policy in the DuPont era that limited onsite retention of all but exposure histories. Records were only retained for two years, and then, shipped to the federal repository, which retrieval of complete records can be difficult, as noted by the DOE assessment team and illustrated by NIOSH's survey results for the 852 boxes that were retrieved.

Someone came off of mute. Did they have a comment?No?

So, the DOE Tiger Team, in 1990, assessment of the SRS Radiological Safety Program does not mention specifically that records were destroyed. The report indicated that there was an issue of the availability of the dosimetry records, that they weren't easily obtainable. So, jumping from not easily obtainable to destroyed is a jump without stronger evidence. And the one we're pointing to here does not specifically say destruction.

So, SC&A reviewed it. Radiation exposure histories are maintained in the dosimetry files in Building 735. All other records are boxed, inventoried, and sent to the federal repository for a storage period of up to two years.

So, we provided -- SRS provided external monitoring data for 74 percent of the subcontractor trade workers, claimants, and bioassay monitoring data for 56 percent of the subcontractor -- sub construction trade worker claimants for the period 1972 to 1990.

And Findings 6 and 7, I've combined them. For the sake of time, I'm not necessarily going to read what's on the slide, but, basically, say the next few slides are going to talk about this whole issue of effective monitoring and where the numbers come into play, and where there's a difference of interpretation, and the reason for it.

So, I combined them because they both addressed that percent. NIOSH agrees with the SC&A finding about 20 percent were monitored in the 1980s. We respectfully disagree with their Finding 7, with 33 percent effectively monitored.

We answered a slightly different question of what percentage of the subcontractor's CTWs were effectively monitored by either method, which was the intent of RPRT-0092. I believe the SC&A answered the question, what percentage of the subcontractor trade workers were effectively monitored that could be used to develop a co-exposure model? They stated that chest counts are not to be used in a coworker development -- now that's the key phrase -- and deleted these data in their calculations.

So, NIOSH, we can use chest count data for co-exposure modeling if needed. Now I think this chart might better explain it more logically, where we have our americium analysis in the left column. You have urinalysis data, the in vitro, and chest count data in vivo. The number of bioassay results from job plans -- and by the way, this comes from 151 americium bioassay results from 35 job plans reviewed between 1980 and 1989.

The 20 percent that we agree on is at the bottom, where we have combined the number of bioassay results from the job bioassay plans that include both

urinalysis and chest count data. So, that's where we get our 20 percent that we agree.

Where there's a disagreement is right in here with the chest count data being used, as a result, from coworker data. So, if you're with a coworker, you did not have a chest count, but they did, we would link you to that and you would receive -- that would be part of that co-exposure model. SC&A excluded this particular column or cell in the data, and that's how they get their 36 percent, which is the 13 plus the 20 gets their 36 percent. The 13 percent comes from the urinalysis data that was included.

NIOSH includes the in vivo chest count data. So, 13 percent plus the 23 percent gives us 36 percent. We include the 36 plus the 20, gives us 56 percent effective monitoring. SC&A basically excludes this and they turn around and say 20 percent from the bioassay plus 13 from urinalysis only comes to 33. I think it's just a minor point, but it's a point to understand, when we start seeing all of these percentages flying around, where and how they were derived. And I think that here it's just the difference of application and what we feel is applicable and what they felt was not.

Member Beach: So, John, this is Josie.

Dr. Cardarelli: Yep?

Member Beach: So, NIOSH is concluding that 56 percent, regardless of the 23 percent for the chest count, that's adequate for the modeling?

Dr. Cardarelli: I can't say -- well, I don't want to speak to what's adequate. I'm giving you what the data presents at this point. I think we can have a discussion on that.

Member Beach: Okay.

Dr. Taulbee: This is Tim.

It is our interpretation of that, and this is why, Josie.

Remember, this is purely subcontractor construction trades workers. We combined subcontractor construction trades workers with prime construction trades workers into a single co-exposure model. The combination of the two we believe would result in a bounding co-exposure model. This is just the subcontractor construction trades workers. Okay?

Member Beach: Okay, and correct me if I'm wrong, but didn't the construction contractor workers typically do dirtier jobs? So, combining the two, you're still not getting, to me, a good balance of what the two different subcontractors did.

Dr. Taulbee: No, I disagree with that statement of the subcontractors only did the dirtier jobs. And we'll talk more about that, actually, when we get into the stratification discussion on Friday. We'll get into comparing the DuPont construction versus the subcontractor construction trades directly. And I think that will become more clear. So, I don't agree with that statement just now and hope we could present that, then, on Friday.

Chair Clawson: So, Tim, this is Brad.

So, what you're telling me is that they did not bring subcontractors in there, turn them and burn them, correct?

Dr. Taulbee: That's not what I'm saying, either, Brad. I'm saying there are times --

Chair Clawson: When we get into this, I want to make sure you understand we want to see proof of what you're saying, not assumptions, because we know it just as well as anybody because we still do it today. That's what we use subcontractors for. We can't risk our people taking the doses. But we see it on a daily basis. So, just make sure when you get into this, I want to see some actual proof on this.

Go ahead.

Dr. Taulbee: I plan to show you some data on Friday

with regards to that. Thank you.

Dr. Cardarelli: So, the NIOSH response to the SC&A findings, which was presented earlier, some were routinely monitored for americium. I won't go through and re-read this whole slide to you because I think we've already talked about that and I'll save us some time. But a key point was why those numbers were derived the way they were.

So, Finding 8: many of the workers, around 70-73 percent, who should have been monitored for fission products underwent appropriate internal sampling the two periods evaluated prior to 1990. However, very few of these monitored workers underwent in vivo counting for fission products. Thus, they were not included in the coworker model developed for SRS and are not considered representative of the unmonitored worker.

So, NIOSH, we believe that there are sufficient data to reconstruct fission product doses for unmonitored subcontractor trade workers. The actual fission product urinalysis results reported for individual subcontractor trades will be used to reconstruct fission product doses.

So, the co-exposure models are stratified to the construction trade workers, which is the prime plus the subcontractors, combining them all into one. This is not a separate; this is total combined. So, the prime contractors were routinely monitored during the entire period while the subs were monitored by special urinalysis up to 1982. And, of course, by 1976, the whole body counts replaced the fission product urinalysis to detect fission product intakes.

So, our co-exposure model may use all applicable bioassay data, including results from specials and routine bioassay samples if needed. So, the model is valid for subs, as the data for all construction trade workers are sufficient for dose reconstruction purposes.

What does this really mean in this particular table

here? We have from 1972 to '73 and the year all the way to 1990. You can see the number of subcontractor construction trade workers is very minimal in terms of having whole body counts up until about '83. Most of it was done by the primes.

Now why are these numbers so low? Because during that time period, if we remember back on slide I think 14, very few, very few subcontractor construction trade workers were actually onsite. They used predominantly DuPont construction trade workers. And that's reflected certainly here, and then we've got our total.

So, although the subs are underrepresented in the fission product co-exposure model until '83, we believe the model is still valid for the subcontractor construction trades because the data included for the prime are sufficient to reconstruct doses.

Dr. Taulbee: I would --

Dr. Cardarelli: Go ahead.

Dr. Taulbee: I would also like to interject on that. Go back to that slide, please, John.

If you look, there's an inverse in the late 1980s where the subcontractor construction trades represent a larger portion of the co-exposure model than the DuPont construction trades workers in that time period. So, it's working both ways within the combined co-exposure model.

Dr. Cardarelli: That's a good point.

Dr. Taulbee: Thanks, John.

Dr. Cardarelli: Yep.

This is just an example of the TWOPOS models that are associated with the co-exposure model. And on the left is the model for the non-construction trade workers, and the one on the right is the model for the construction trade workers, which also includes the subs.

There's a lot of similarities between these two, and one thing that might even be interesting and worth noting is that the trend, and almost the annual basis, almost supports not doing any stratification at all because these are nearly identical with regard to their patterns of exposure.

So, is it really necessary to even split between construction trade workers and subs or non? That could have been used in the argument. But, if we're going to split them out by construction trade and non, that's fine.

What we've done here is, when you start splitting out -- and I think that this was acknowledged in the last presentation; this is why we can't do further splitting by trade -- the numbers and the statistics begin to be the biggest limitation, which leads to great uncertainties. So, the larger your cohort population that you're trying to model, certainly the better statistics are, and that's what you're starting to see here. When we separate these out, we're missing some years and we had to combine years to get the statistics there.

So, Finding 9: SC&A does not find the data collected as part of the RPRT-0092 review to support the premise that subcontractors on job plans that should have been required internal monitoring for americium were either directly monitored, around 20 percent, or alternatively, appropriately representative in the derived worker models for SRS, around 13 percent.

I think this goes right back to this particular slide that I showed you earlier. It's just understanding where the numbers came from. Again, we respectfully disagree with SC&A. The effective monitored calculation is the total of the directly monitored, 20 percent, and the indirectly monitored, 36 percent, which gives us our 56.

Again, we reaffirm our position that subcontractor construction trade workers performed work and were monitored similarly to prime construction trade workers. Therefore, the development of the co-

exposure model can be used to estimate unmonitored subcontractor construction trade worker doses. And it was that 20 plus this 36 that gives us our 56 percent.

So, moving on to the next slide, Finding 10: data for 1990 are lacking. Therefore, 1990 should be included with the period of limited data and not bundled with the year of 1991.

What we see here is NOCTS data indicates that 89 percent, right here -- by the way, I'm assuming you can see my little arrow. Okay? The 89 percent of the subcontractor claimants working in 1990 have in vitro or in vivo monitoring. So, we believe that that 88 percent direct monitoring for subs across those various radionuclides -- plutonium, strontium, uranium, americium, and neptunium -- is not demonstrably incomplete. These data can be categorized in the 1990-to-1998 timeframe.

Finding 11: for both '72 and '89 and 1990-to-1998 periods, when considering all radionuclides requiring internal monitoring per work permit, as opposed to at least one radionuclide requiring monitoring, the percentage of monitoring workers dropped significantly. Directly monitored workers ranged from 44 to -- 47 percent to 77 percent in comparison to the 76 to 96 percent in the RPRT-0092, and effectively monitored workers ranged from 55 percent to 89 percent in comparison to 85 to 99 percent in RPRT-0092.

I think Bob did a really good job of kind of describing why this occurs, and it just comes down to the decision that we made that we looked at the sampling plan and considered that, if you had one bioassay, then that was sufficient to make the connection.

So, a worker can leave a bioassay based on either the routine schedule or the job-specific requirement. They would say, if the job-specific requirement said uranium and plutonium, and you only left a uranium, if they're on a routine plutonium program, they're going to leave a plutonium measurement and that's

going to be adequate, even for that job-specific plan. That's the physics behind why we would make that assumption, and why we also stand by the results given for effectively monitored workers. There is sufficient data to reconstruct doses using a co-exposure model based upon this approach.

Observation 1 I think is the only one that was not recommended right now, 1 and 5, by SC&A for closing out. So, I'll go over this. The back application of assumptions regarding work permits, job-specific bioassays, and target radionuclides to conduct a completeness review is not plausible, given the significant changes in radiological policies, procedures, and practices that occurred in the early 1990s.

As we've said, we do not assume the monitoring practices in the '90s regarding the work permits, job-specific bioassays, and target radionuclides was applicable to the 1972-1989 timeframe for completeness. Radiological practices were done consistent with Department of Energy orders in place at the time. So, applying what was done in Westinghouse back in the '70s would, frankly, be inappropriate when you look at how the routine bioassay monitoring requirements were done.

And I've listed two here: DOE 5480.1. They monitored workers primarily if they exceeded 10 percent of the quarterly dose limit for external and internal, and that changed to an annual effective dose of 100 millirem in the 1989 -to-'90 period with DOE 5480.11. And prior to that, it was based on the maximum permissible body burden.

Despite all of the criteria of when to do monitoring, they always had a zero exposure policy which said no workers will be exposed and we will back that up by doing routine monitoring. So, the expectation was zero. That's the assumed result, unless there's an incident. Then, there's special. That would result in the dose where we would then begin to apply these DOE orders. And that's kind of the big picture on that

Observation 1.

For the sake of time -- and, Tim, I'll let you chime in if this is okay -- I'm going to make a suggestion that, since SC&A has made the recommendation to close Observations 2, 3, and 4, I'll save us the time of going through that explanation. So, if no one objects to that, I'll move forward and go straight to Observation 5.

Dr. Taulbee: This is really a question for Brad, as the Chair, as to whether he accepts SC&A's recommendation to close those or not, Brad and the Workgroup. That's not our call.

Dr. Cardarelli: Yes. Brad?

Chair Clawson: I guess I'll just take comments from the other people in the Workgroup. I have no problem with closing those. SC&A has already -- our contractors said that they could go ahead and close it.

So, Phil? And Lockey?

Member Lockey: Brad, I agree with that. Jim Lockey.

Chair Clawson: Okay. We'll go ahead and move on then.

Dr. Cardarelli: Okay. The last one I think was Observation 5. Bioassay data in the '90s are not entirely free of the earlier data issues. The implementation of methods used to correct for the bioassay deficiencies seen in the '70s and '80s did not take place immediately, and that's true with the change in the contracting company in 1990. It was not a step function that took place in '90. Instead, it took a number of years to identify, address, and effectively implement the changes. For example, there was only one RWP for one subcontractor construction trade worker listed for 1990 in RPRT-0092, and specific radionuclides were not required on the RWPs until the mid-1990s.

We certainly acknowledge that it took time for Westinghouse to fully implement their radiation control procedures. While several deficiencies were identified by self-assessment and the auditing during this era, NIOSH believes that none of these are consequential to the operation of the routine bioassay program or ability to reconstruct doses with sufficient accuracy for compensation purposes.

Then, I have a statement in here from the 1990 Tiger Team report where SRS basically responds to DOE. And I'll just paraphrase this one sentence that says: to conclude that a sound technical basis for the existing program does not exist is somewhat excessive.

And they were basically challenging that the entire program itself was inadequate, and SRS challenged that through their documentation. So, we do believe that the data can be used for doing dose reconstruction purposes.

And that concludes my presentation.

c. Work Group Discussion

Dr. Roberts: Okay. Are there any questions or comments?

Member Ziemer: This is Ziemer. I have a question, I think probably best to either Joe Fitzgerald or Ron Buchanan.

It relates to the 11,000-plus bioassays which appear to be mainly from areas other than 773-A. What is SC&A's view on the ability to use those bioassays as part of a co-exposure model?

Mr. Fitzgerald: Well, let me answer. Certainly that data was always out there and it's now being coded. But when this was originally started, going back to the RPRT-0092 sampling plan, the whole approach was looking at completeness.

The issue is not the total amount of data. It's the

question that was raised in 1996 and '97 that evidence showed that a large amount -- 79 percent was defining in '97 of the job -- the RWP-indicated job-specific bioassays were missing. And as you recall, that was the impetus to say there's got to be a way to look at whether or not that circumstance predated '96-97, and if it typified job-specific bioassaying of subcontractors in previous years, that would cause them to be underrepresented in a coworker or co-exposure model.

So, it's not a question of the total amount of data available. I mean, certainly, if you combine all of the special bioassays, the incident-based bioassays that you could find for subcontractors, if you added that to all the hundreds, if not thousands, of routine bioassays that would be available, and also added in, obviously, whatever job-specific bioassays there might be -- in other words, the total universe of bioassays for subcontractors -- it would be a large number, but it wouldn't answer the basic question that was the reason that 0092 was written and the reason we got into this, which was, how representative is the subcontractors on job-specific bioassays? Given the fact that so many of the bioassays were missing in '97, what confidence level do we have that that's not the case in previous years? That was the basis for the design and the objectives of RPRT-0092.

And now, what we're talking about is reaching out and gathering all this additional data. Well, we could have done that three years ago. I mean, certainly, you could gather a lot of data, not just routines, specials, incident-based, and you would have a lot of data that would speak to subcontractor exposure. But how complete is that in the context of job-specific bioassays required by RWPs? That was the going-in proposition.

And this is, to me, plan B, which I think John mentioned. If you could not answer the question that 0092 was intended, then a different approach may be needed. Certainly, that would be the different

approach, but as far as the objectives that we originally got into this in 2017, reaching out and gathering all this data in terms of the sheer number of data, that's what we're talking about. We have all this data, hundreds, if not thousands, 11,000 data points, but what does that actually say about the completeness of the job-specific bioassays paralleling the 1997 question? That's, to me, what's relevant.

Dr. Taulbee: This is Tim. If I could address that a little bit and help, hopefully, Paul, answer your question, at least from our perspective.

The 1997 bioassay issue that Joe keeps bringing up was job-specific bioassay, and that was for people who were not necessarily on the routine bioassay for that radionuclide when they did that job. And so, it comprised a small proportion, and we've shown a graph of that. And I think John will be showing that later at some point; I'm not sure.

But it's 95 percent of the people were monitored through the routine program, and subcontractors included in that. And I think RPRT-0092 clearly defined -- clearly -- from 1991 for sure through 1997, that the subcontractor construction trades workers were adequately monitored, or monitored -- I shouldn't say adequately -- monitored to the point where a co-exposure model would clearly cover their exposures.

We went through and we looked at the RWPs in that area and we looked at whether those workers were monitored on a routine or job-specific. They're still a subcontractor. Okay? If they were on a routine program, they were monitored; we have their data, and we could make a co-exposure model from that.

So, in that time period, I think RPRT-0092 clearly met the objectives. Where we didn't meet all of those objectives, as SC&A has been pointing out, is that 1972 to 1990, because we didn't have a large sampling of RWPs available for multiple areas. From the areas that we did see, and doing the comparison, we did not see any discrepancy, any difference. Less

workers were monitored, sure -- that's in the DuPont era -- but we're still seeing the same thing of workers who were subcontractors were not excluded. They were on the routine program, or if there was an incident, they were on the special program. And so, the co-exposure model would still apply over that time period.

I hope that helps.

Member Ziemer: That's helpful to me. I wanted to get both views on how you addressed that group of bioassay. The large number, as Joe said, and how do you address the adequacy of their use? Yeah, thank you.

Dr. Taulbee: Are there other questions?

Chair Clawson: So, Tim, you were saying, from '90 to '97. What about '72 to '90?

Dr. Taulbee: '70 to 1990, we see we only have data from one area to do that RWP job plan comparison. Okay. We don't have the job plans from other areas. They were using a different method. They were using the DPSOLs. And we could not meet that objective in RPRT-0092.

But that doesn't mean that those workers weren't monitored. They clearly were. And when you look at the slide that John's got up right now, slide 15 there, you can see from the plutonium bioassay logbooks, you know, it ranges here from 56 that appear in 1978 to 1800 in 1988 workers being monitored, subcontractor construction trades workers being monitored. Okay. So, this is just the subs. This isn't combining all construction trades. This isn't combining prime and subcontractors. This is just the subcontractors. Okay? And so, there is a lot of monitoring amongst these workers.

Mr. Fitzgerald: Yes, and if I can add, there was a lot of monitoring of subcontractors in 1997. So, the question is not whether subcontractors had a high degree of monitoring. The question is whether those

who were on job-specific bioassays actually got them.

I have to keep going back to that because three years ago that was, again, the impetus to look backwards and actually come up with a sampling mechanism that would look at permits, look at job plans, and actually demonstrate that you had follow up and a percentage completeness on these bioassays.

Dr. Taulbee: I think if you look at the 1990 data, 1991 through 1996, you will see that we've demonstrated that, that those workers were followed; the subcontractors were, in fact, monitored.

Mr. Fitzgerald: Yes, and I think we acknowledged that, in fact, starting in the early 1990s with the Radiological Improvement Program Westinghouse put in place and the accountable procedures, and an actual RWP program that did not exist before '91 at Savannah River, things got better, and it enabled the analysis that 0092 was intended to do in terms of matching up job-specific bioassays to actual RWPs, so that -- and we do say this -- that it certainly makes it feasible to do the kind of completeness analysis that was intended in the beginning.

The only question we had is, you know, there's a step function somewhere in there, '90, '91, '92, where the RWPs are sufficient and the job-specific bioassays are complete. So, we're not disagreeing in substance; we're basically trying to clarify timeframe in that case.

I don't think we believe that's the case before 1990. And again, it's not any fault of the intended -- the objectives of 0092. It's just that the records, the 852 boxes, didn't produce the job plans and SWPs and RWPs, on one hand, which is the scoping issue of facilities. And it just turned out that, in terms of checkoffs on forms and actual follow up, that one could actually have taken this from the job plan, you know, it was supposed to be a direct measure of RWP-to-bioassay relationship that's right from the

sampling plan. That couldn't be ascertained just because, again, it was clear that that linkage did not exist, at least in the DuPont era.

So, if you're talking about trying to, as IG-006, the guidelines say, you're to determine if there are sufficient measurements. That's the key, sufficient measurements for this particular category, the subcontractors on job-specific bioassays. For '72 to '90, I think RPRT-0092 falls short from that timeframe, and for the reasons we just discussed.

There may be additional data that one can code. There may be more data in NOCTS, et cetera, et cetera, but those are sources that could have been available before. I mean, that's not pertinent to 0092, what was trying to be accomplished in 0092. It's a plan B, if you may, for adding additional data and considering a different way to do it.

But, for 0092, again, I think there isn't a measure, as required by the Implementation Guide, as to whether there were sufficient measurements for those subs, not all subs, just the subs that were, again, on job plans and SWPs in that timeframe.

Dr. Taulbee: Again, I would point you back to -- you know, I agree that we did not meet all the objectives in that early time period in 0092. We could not look at more areas other than area A. But, in area A, we did not see any significant difference there. We did not see that, oh, my gosh, you know, the subcontractors weren't monitored or were only, you know -- what was it? -- 10 percent were monitored. That's not the case, especially for plutonium in that time period. Americium there is a decrease, but for the plutonium in that area we've got a large number of the job plans indicating that they were monitored.

So, yes, it's only one area and we didn't meet all of the other areas, but we have no evidence to the contrary that, if those records were available, that it wouldn't be, that we wouldn't be able to fill in that whole time period. We can't do that; I recognize that.

Chair Clawson: Tim, this is Brad.

How can you say that when you've only got the information for one area? You're saying, well, this one area did it, so all the others must have, too. Show me the scientific proof of that.

Dr. Taulbee: Well, if you look at slide 16 that John's got up there, Brad, in A area where we were able to compare, there's only 438 plutonium bioassays. And we were showing a high correlation between the job plans and those workers being monitored.

Look at F area and look at H area and the Central Shops area. They have way more in that time period. So, I mean, this is the bulk of the plutonium monitoring data, is in the areas where you would expect plutonium.

Mr. Fitzgerald: I guess for the Workgroup's benefit, I'd take you back to early 2018. The charge, I think, that the full Board gave NIOSH, based on the discussions that took place in the Workgroup in 2017 and beyond, was that the original review -- and there was an original review; I think it was 0083, if I'm not mistaken, maybe it was a different number -- but that Tim and his team did at 773-A wasn't enough to answer the question about sufficiency of data, the completeness of the data.

And Jim Neton -- not Jim Neton -- Jim Melius himself specifically brought up two points: that it had to be more than one facility and it had to be more than 1981 to 1986 to properly address that question. So, that was the charge to do RPRT-0092 and to address more than just 773-A.

So, yes, certainly some observations, additional observations, have been made about 773-A, but the reality is that 0092 did not accomplish the major objective that the Board gave it, which was to be able to address what the representativeness of that question would be for other facilities and other timeframes.

And I think it's minimizing the implication of just having one data point in order to answer the question of whether or not subcontractor completeness is sufficient to be represented in the co-exposure model. That's been our finding all along since this came out.

Now, you know, we appreciate and accept the reason that occurred. I mean, it just so happened that -- and we had thought the 852 boxes held a lot of promise to deliver enough records to do the assessment in that early timeframe. It did not. So, there's no way to really answer that question of the objectives posed in 0092 adequately, given that circumstance. It does help a great deal for after '90, and I agree with Tim on that.

So, that's where we are. I mean, after three years, that's where we are.

Dr. Cardarelli: Joe, I just wanted to add I'm glad that you acknowledged the fact that, if the data just isn't there, the records aren't there, and we can't achieve that objective, that doesn't mean that we failed in that objective. It just means that the data wasn't there to support doing what we were originally charged. And I think that's a good point.

One of the reasons I put this particular example in was to demonstrate that I could not find any examples where there were subcontractor construction trade workers who were involved or left a routine that were left out or treated differently. And that's why I put this in there, because it was five different people, three different types of employers, and they were all treated exactly the same. And I think that that speaks to the culture and the monitoring practices and philosophy, and this is 1972. I don't think that that would have changed.

We can go and maybe search other skin contamination logbooks to see other ones, but this was the one that we were able to find. And I would certainly be willing to look at any evidence that you could produce that says that they were treated

differently. I think that would be --

Chair Clawson: Well, John, that's very good. Show me, maybe giving me 500 more examples of these that you just put this one up there for. You have not met the criteria that was set forth. Show us completeness. And this is what we've been trying to achieve.

And please forgive me if I seem a little bit frustrated, but this is 13 years now with Savannah River, three years with 0092. And we still are nowhere, in my feelings, any closer than we were.

Dr. Taulbee: One area where I would -- I understand your frustration, Brad. I clearly do. The one area where I feel we are a little closer on agreement is the 1990-forward area. And that's where RPRT-0092 did meet the objectives in my opinion. We clearly demonstrated that the subcontractors were monitored and make up a large fraction of the monitoring of randomly pulled RWPs.

And we've demonstrated that they were monitored appropriately from those RWPs; that there is sufficient numbers that we can demonstrate or we can develop a co-exposure model, and that there's that issue from 1997; it does not back-extrapolate for the job -- the job-specific bioassay program was a small fraction of the overall bioassay program, as I demonstrated back in 2018.

That RPRT-0092 is done. So, I feel like we have demonstrated that aspect of it. Clearly, yes, you're right, Brad, we need to -- the pre-1990 time period, we did not meet the objective of demonstrating across all areas and all time periods because we just don't have that data. So, that aspect, you are right, we are not any closer than we were then. But I do feel the 1990-forward we've met the objective.

Chair Clawson: I agree that we've met quite a bit of it. I think we still have some work to do on it, though. Well, '97 really is interesting to me because, yes, they went and they pulled everybody; they got

everything up to 100 percent. But 78 percent was missing in that. I think that we still have some things to do. But I'll tell you, from '72 to '90, I do not think that you have met it.

Member Lockey: Hey Brad, Jim Lockey. If I can, I'd like to ask a question. And this really follows up on your concern, Brad, about contractors being brought in to do job tasks that primes may not want --

Chair Clawson: Hey, Jim, can you talk up just a little bit? I'm sorry, I'm having a hard time hearing you.

Member Lockey: Can you hear me now?

Chair Clawson: A little bit better, yes. Speak up, use your big-boy voice.

Member Lockey: I'm doing the best I can now. Okay, so I want to follow up on that question that you had or the concern you had about subcontractors being brought in to handle jobs that don't want to be handled by, say, the prime contractors or by management on site. This goes both back to NIOSH and SC&A.

If you went back and looked at the subcontractor bioassay data and you compare that to the prime bioassay data, both routine data but more importantly incident data, is there any qualitative or quantitative differences in that? For example, if I look at incidents data for the subcontractors and I compare that to incidents data for the contractors, is there a qualitative or a quantitative difference in that data?

Dr. Taulbee: We have not compared that, Dr. Lockey. That is something that could be done because we do have that data broken out from that standpoint. Well, we have the data available, I shouldn't say broken out because I'm not sure all the incident data's been coded.

But with regards to the routine monitoring, or the combined actually, routine and special monitoring

between primes and subcontractors, that is some of the data that I'll be presenting on Friday during the stratification discussion, where we have compared I believe five years' worth of data of just the prime construction trades workers and the subcontractor construction trades workers broken out separately. So we do have some quantitative data for a comparison from that standpoint.

Member Lockey: Let me follow up on that question then. Would that be a way to have some reassurance one way or the other regarding Brad's concern, which is also my concern, seeing I've been involved with workplace situations that subcontractors sometimes are brought in to do jobs that nobody wants to do?

And if you found a significant qualitative or quantitative difference in the bioassay data, that would have some real, some significant implications for me, that the subcontractors in fact are different.

Dr. Taulbee: Correct, and we can, I will show that comparison. Just a little bit of a spoiler here. We do not see much difference between the 90 -- the 50th and 95th percentiles of those distributions, and I will show that.

Member Lockey: Is that routine or incident data?

Dr. Taulbee: It's the combination of the routine and incident data. Now, again, the incident data could be broken out, we could do that type of an analysis separately, if desired, from that standpoint.

Member Lockey: Would it be -- let me follow up. Joe, would that be interesting to you?

Mr. Fitzgerald: Well, it would be interesting, but let me throw a qualifier in. If, and we've gone through this with other sites, if you're missing 79% of your RWP permit-indicated bioassays, then, you know, whatever analysis you're doing on the information that you do have is not going to be complete.

So you know, the precedence of what we have been

doing is to establish do we have a complete data set. And I'd be interested if in fact that it could be, you know, shown, you know. Then, you know, are the subs that are doing prime work versus the other subs, if it's comparable that, you know, that you're showing they're not doing the dirty work.

But you're missing up to 80% of the data to begin with from the RWPs, then what the heck are you actually comparing? You know, that's the problem I got. You got to at least show you got all 52 cards in the deck before you start comparing things.

And I don't know if we've actually done that yet. Except I think we're closer on the 90s, as Tim has suggested. But, you know, again, I don't know how we can get to that answer without answering the first question on completeness.

Mr. Barton: And this is Bob Barton. Just to add onto what Joe said there, as far as qualitative, this whole notion that they brought in subcontractors to do the dirtier work, that comes from the interviews with former workers. In fact, that position actually appears in one of NIOSH's reports from back in 2017 when we looked at stratification for the first time.

And Tim is correct that on Friday we'll be discussing whether, if it's deemed acceptable to use a co-exposure model, whether we need to break out subcontractors from the regular construction trade contractors. So I don't want to get too far ahead on that.

But again, the qualitative evidence was statements made by the actual workers, that they were brought in to do the dirtier jobs to save the exposures from the prime construction trade workers. So that's your qualitative evidence right there.

And just to comment on, there seems to be a lot of emphasis put on plutonium. I think for that earlier period, our main concerns were really about americium. In fact, when we look at the numbers in SC&A's review of '92, I'm looking at them right now,

we were remarkably close on plutonium when we talk about this notion of effectively monitored, that is, how many were directly monitored or on the same job plant as someone who was monitored and had their co-exposure result.

So I mean, for '72 to'74, SC&A came in at about 65%, NIOSH came in at about 69%. Whether 69% or 65% is acceptable, that's obviously a judgment call. In the 80s it's much higher in that both SC&A and NIOSH came in at about 97%. Again, just for plutonium. But our main concerns really centered around americium.

Also there's a lot made of these, the incidents. And I would just point out that if there is an incident that, you know, requires significant intakes or uptakes or high bioassay results, often those workers were chelated. And we don't use those in co-exposure modeling.

So I'm -- so those incident-related data is important in that it shows that there was follow up surveying, but it has nothing to do with co-exposure modeling if there was chelation involved, because all those samples are removed.

You know, a couple of other comments here. Let's see, I was just trying to jot down some stuff as John was going through his presentation. Like I said, we're basically in agreement on plutonium. Slide 15, a lot was made about slide 15 where it showed the number of workers, subcontractors, monitored by year. That was contained in the plutonium bioassay logbook.

Again, that's not the number of subcontractors that were potentially exposed, that's just the data we have for them. So, showing that there's a small number there in the 70s, and then it grows, that just indicates the numbers that were actually monitored.

But the question we're trying to get at here is how complete are those job-specific bio assays, which really involve the more transient-type subcontractors, which according to former worker interviews, were brought in for the hot job. So they

wouldn't be on a routine bioassay program, and if there was no incident identified, it's quite possible those intakes could be missed.

Also, it was indicated that, let's see, slide 32. This is, again, talking about the americium data. And it says 1980-1989 as the period that was evaluated. That's, it's actually 1981-1987, because those are the only years where we had those job plans to be able to evaluate.

And again, only for the F-Wing of 773-A, even though there was separated americium at at least one other location, and possibly a third that we point out in our most recent report.

And NIOSH says that the americium data could be used in co-exposure analysis, and I'm a little -- that's certainly something that would bring up that number to the 56% quoted on this slide. I'm curious how that would work, how you would mix in vivo and in vitro data to come up with one coworker model.

But again, I mean, is 56% really a good number either? And that's obviously a judgment call and a policy decision for the Work Group and the Board as a whole.

Dr. Taulbee: With regards -- go ahead, Brad, I'm sorry.

Member Schofield: Yeah, this is Phil, I've got a couple comments here. One, the statement about the subcontractors being brought in to the dirtier jobs, if you go back through I don't remember which document it is just for this meeting, it is written in one of those documents. And I just, right off the top of my head I can't remember which one it's in there.

The other thing is, I would find the subcontractors more than likely bounding for the prime contractors, just because they are doing these dirtier jobs. And based on some of the interviews, a lot of these contractors, you know, when they got done with the job, they were told to leave a urine sample.

Well, they're not coming back. They were here for maybe three days, five days, and they leave without leaving a sample. So we're going to be missing a lot of data there too.

Chair Clawson: Thanks, Phil. You know, one of the things -- this is Brad speaking. One of the things that is really hard with this is we are -- we also have a lot of data being dumped on us. We're looking at the years from '72 all the way up into '97/'98. I kind of want to, and tell me if I'm being wrong or whatever, I want to just look, for this discussion, I want to look at just from '72 to '90. And in that area, I do not believe that we have met the criteria was set forth with this.

One of the things, if you start reading in the CATI reports and stuff like this, this is where most of this comes out. These guys were coming in, some were here for a week, two weeks, they were gone for months. Come back the next year, get burned out again, and they're gone and they're off on the road and stuff like that.

I don't think that we have achieved what we needed to do on this. And I -- you know, I'm just looking at this time period right now. I know that we go up into the '97 because this is also the thing that bothers me about it is when we get to the '97 time period, that we're missing 78%. And this is after Westinghouse has been in there for a few years.

But I think that is a section for another day. I want us to really look at from '72 to'90, have we accomplished what we set out to do with '92. And my personal opinion is that we have not. We have not demonstrated that.

I know that when we go into '91 and everything else, there's going to be some other stuff. But I want all of us as a Work Group to be able to look at that right now and look at what there is. Because we're going to be in -- there's a lot data out there, I'm not saying that there isn't. But we have not met what the met what the criteria was set forth for us.

Dr. Cardarelli: Hey, Brad, this is John Cardarelli. With that period of '90 -- '72 to 1990, obviously we don't have the RWPs that were really implemented by Westinghouse. So to achieve kind of what you're looking for, we were looking at all other alternatives, and we have it take a different approach, which is what we've done.

Is there another approach that you would like for us to do or see or look at that might be able to answer that, given the fact that they just operated differently and collected different types of data, which make it very difficult for us to link to answer the question that we thought we could answer when we first started this, not knowing that we would not have that critical data for the pre-'90 area. What other options would -- could we look at?

Chair Clawson: The SECs, just like what the program was set up for. When you have insufficient data and you'll not be able to do completeness of data, you do an SEC.

Dr. Cardarelli: I would argue maybe -- I think that we would argue that there's reasonable completeness of data. We think we can do dose reconstructions using the co-exposure data that we have in place. So setting a standard based upon the Westinghouse and applying it to the DuPont and then say you don't need what Westinghouse did, so therefore SEC is kind of illogical, we need the data.

You know, if we didn't have any data, I would be 100% behind you. But right now we've got a plethora of data, you've said that. And I'm just trying to figure out a way to show completeness to meet your satisfaction.

Chair Clawson: We don't have the time anymore, John.

Dr. Cardarelli: Okay.

Chair Clawson: Thirteen years, 13 years. Do you know that the original people that filed this are all

dead? Do you know what it's like for me to have to answer to these people's families that, yeah, Mike, he died five years ago, two years ago, and we still have not solved this.

I understand about the data, and we get into this all the time. We can look at Fernald, we can look at all of these. And we have a lot of data out there, but we couldn't meet what the criteria set forth for us.

And as a Work Group, this is where it comes down to us. I am not saying in any way, shape, or form that you guys have not done a great job. But if the data is not there, if there information is not there, it's not there.

I've -- Tim and Joe can both testify to this. I don't know how many trips I've made to Savannah River down there. We've been through this whole thing, and one of the biggest things, and the people have told us this from the very day one, well, it's going to be hard for you to get the information because I never left anything there. I was a transient worker, I went there, I'm gone, I'm this, I'm that. It just isn't there.

I understand that there's a lot of number-swapping and everything else that we can come down to, but we've also got to come down to accountability for this. And I really think, and I'm going to throw this out to the Work Group right now, I think that we have an SEC here from '72 to '90. Now, I'm not saying for the primes or anything else like that. I am saying just for the subcontractor workers.

Dr. Taulbee: Brad.

Chair Clawson: This -- yeah?

Dr. Taulbee: I would -- I guess one of the things that we haven't discussed as a Work Group or you haven't addressed or discussed is if you look at RPRT-0094 that we put out back just before the last, before the December Work Group meeting last year, we really haven't discussed that.

And this is what's causing me some concern here, is that we have monitoring data for a large fraction of subcontractor construction trades workers that are claimants. And these are people who have filed claims, and it's well above what the monitoring -- the percentage of people being monitored is in the 80s, 80 percentiles, as I recall, for the 1980s for sure. And --

Chair Clawson: You mean in the NOCTS system.

Dr. Taulbee: These are in the NOCTS system. These are subcontractors in NOCTS. So these are people who filed claims. And so we have a high percentage of them being monitored over time, and we've documented that in RPRT-0094. And I'd really encourage the Work Group Members to review that.

And I don't know that SC&A has reviewed it and made comments on it, I really can't remember. Bob, do you -- Bob, Joe, do you remember if you've reviewed that report and made comments on it?

Mr. Barton: I believe we were just tasked with that a few weeks ago, to take a look at that. But again, I mean, that's looking at the totality. And I think one thing that sort of got glossed over in this whole discussion is the statement of whatever percentage it is that the workers were monitored.

But monitored for what? Were they monitored for the correct radionuclide based on what job-specific things they were doing? I think a blanket statement of saying, well, they were monitored for something loses the connection between the work they were actually doing and whether they should have been submitting those job-specific bioassays.

And that's the whole question here. It's not the totality of data that we have, it's whether there's a group out there, mainly the workers who should have been monitored via some sort of job-specific mechanism, and whether -- what we can look at, which is very limited in my opinion, prior to 1991. I'm not sure that's borne out, that there was a

relationship between what should have happened and what did happen.

John mentioned that, you know, we can't hold the DuPont era to the same standard as Westinghouse, and that's entirely a fair comment. But the question is is did the monitoring process that was in place adequately capture the potential for intake to some of these transient subcontractors that should have been monitored via job-specific, and were they or were they not?

And the data is severely limited, and what we see, particularly with americium, is concerning from SC&A's viewpoint.

Member Schofield: This is Phil again, I'd like to make a comment on that. We have given SECs to different facilities based on the fact that maybe they were only -- we were only seeing monitoring for uranium or plutonium, you know, fission products, americium, strontium, whatever else it might have been, they weren't being monitored for.

And on that basis, we have actually granted SECs. And since a lot of these subcontract people, some of them came back and forth with several different contractors. It just depended on who they were with that week or month. And we know we can't even, I mean, it's been stated we have not been able to identify all the subcontractors who have ever come in and out of Savannah River. That's all I got to say.

Mr. Fitzgerald: If I could ask -- can I ask a question of Tim, just from what he was saying about the '94?

Chair Clawson: Sure.

Mr. Fitzgerald: Yeah, this is interesting to me because this goes back discussions that you and I and the Work Group had back in 2017.

Because after we got some interviews from Savannah River that alluded to the subcontractor records being kept in a separate file and the original completeness

question started coming into place, you know, where were those records, were they complete, whatever, I remember you had examined a couple different courses of action before you arrived at the, you know, the 773-A review and the RPRT-0092 review.

And you looked at the Center to Protect Workers' Rights, that database, to see if you could do a completeness review of that. You also looked at NOCTS, you looked at NOCTS back there. And in both cases you decided that neither data source was adequate to answer the question on completeness.

I guess I'd be curious, what's happened with the NOCTS database as reflected in '94 that's different than what it was a few years ago? Because clearly you believe there's data that you can use in '94, and you pretty much discarded that option three years ago.

Dr. Taulbee: I wouldn't say I completely discarded it three years ago. I felt at that time that doing this direct comparison with RWPs would be a better source to directly answer the question. So --

Mr. Fitzgerald: Okay.

Dr. Taulbee: That's my interpretation of that.

Mr. Fitzgerald: Okay, like I said, I remember NOCTS coming up back then, but it wasn't selected as the way to go, so thank you.

Dr. Taulbee: And what '94 gives -- or, and I understand what Bob is saying about, because we did categorize it by actinides or tritium and whole-body count, that type of thing. So it is more general than perhaps what the Work Group is looking for here.

But one of the things that comes out from RPRT-0094 is just the large number of current claimants that have personal monitoring data. And so if only a small fraction of them who worked on these RWPs were monitored, then that would bear out from the subcontractor's standpoint, and it doesn't, in my

opinion, okay.

There is a large fraction of them that have plutonium bioassay year after year after year. And americium I can't speak to directly, Bob, I don't recall if we ever looked at that, broke that out separately or not, along those lines. So I mean, that is another potential approach, but I understand, you know, what Brad is saying of, you know, we have been working on this a long time.

But I do think the RPRT-0094 should be considered by the Work Group as a whole, at least discussed potentially as an avenue, or you know, maybe it doesn't meet your needs from this standpoint. But I don't believe that is something that we have addressed.

With regards to what Bob has been saying about americium is where we seem to be having the disagreements with regards, or that's where you're finding a potential issue. That's the next topic on our discussion here today.

And so I would actually ask that we go through that. We've got a couple of presentations with regards to that, and I believe it feeds into this discussion for RPRT-0092, but that's just my suggestion to you, Brad.

Chair Clawson: Well, that's fine. We want to make sure that we get the best data for all of this and the best information and everything else like that. But you remember what I told you almost two and a half years ago, this is -- we're done, we're it. So one of the things I'd say is let's go ahead, launch into the americium and let's -- if I didn't see that on our agenda, so I was wondering --

Mr. Fitzgerald: Brad?

Chair Clawson: Yeah?

Mr. Fitzgerald: Yeah, they're related because it involves americium and there's some overlap. But I

don't think the 0091, RPRT-0091 discussion is going to solve the 0092 issue that we're talking about with the americium. It's a question of enrollments versus completeness.

And I don't think we have tied up 0092. I think it sounds like there's some kind of coalescing around the fact that '72 to '90 didn't meet the objectives of RPRT-0092. And, but I'm not sure we have closed out the implications of that. You know, where's that leave us.

All I've heard is that, well, you know, there's a certainly a, you know, a rework on the NOCTS, and that's in '94. And there's an acknowledgment that the, a lot of the ample data that NIOSH has cited would not necessarily answer the specific questions that we want answered. But you know, we've been at it for three years.

So I guess the question is, you know, 0094, I mean, RPRT-0092 was the culmination of that, all that effort to look at the completeness. And you know, I know Tim's team, John's team, and our team has put a lot of work into this.

And I guess the question is, you know, where's the Work Group see this as far as a conclusion. Is there any other issues or questions we can give you, any information that would enable you to reach a conclusion?

Mr. Mahathy: This is Mike Mahathy, if I could add one detail about 0094 is that we plot -- we chart it out by month. And you can go in and see how a large majority of these subs were not there for a day or two, they were at SRS for weeks, months, some of them for years. So we found that very few of these workers actually went in and were there two or three days and gone.

Chair Clawson: Mike, can you separate from the subcontractor to the prime contractors? Can you separate all of those out?

Mr. Mahathy: These were --

Participant: Yes, we can.

Mr. Mahathy: Ninety-four only is only subcontractors, not prime contractors.

Chair Clawson: Right.

Mr. Mahathy: It's a higher level, it doesn't go down by radionuclide.

Chair Clawson: Right.

Mr. Mahathy: But it does show they were consistently monitored over the period of years for most years. I just wanted to add that one little detail.

Chair Clawson: Well, and all that comes back to were they monitored for the right details too. That's what this whole thing was supposed to come back to. And this is why -- this is why we set up the sampling plan the way that we did. What were we going to need to be able to accomplish completeness for this.

And I will be right honest, and I've already made myself clear, I do not think that we've met it. I guess I'll throw this out to the other Work Group Members that are with us here. Are there anything else that you guys need? Because right now, I'm pressing for an SEC from '72 to '90 for the subcontractors, not for the prime, for the subcontractors. Because this where we're at on it. And --

Member Ziemer: Brad, this is --

Chair Clawson: Go ahead, Ziemer.

Member Ziemer: Brad, I'm not actually on the Savannah River Workgroup, so. But the SEC Workgroup is sort of looking at whether we meet SEC requirements.

But one of the questions I had, and maybe Tim can answer this, has the DCAS staff ever gone back and looked at the claims that have already occurred,

particularly for that period up to 1990, to determine to what extent have we had claims where you found that you didn't have bioassay data or it was not for the right thing?

Do you know what the history of it is? That might tell us the extent to which we don't have enough representative data.

Dr. Taulbee: Yes.

Member Ziemer: I know we're looking for a coworker model possibly, but we've had an awful lot of claims that have been handled already based on individual information.

Dr. Taulbee: That's correct, Dr. Ziemer. We have a lot of bioassay data for the individual subcontractor construction trades worker claims that have enabled us to complete those reconstructions for those workers.

With regards to what they were monitored for and, you know, whether they were adequately monitored from that standpoint, plutonium is obviously the clearest that we have the data for. When a worker is indicating that they were working in F area or H area and we have the plutonium monitoring for the subcontractors construction trades worker, we can estimate the dose there.

What RPRT-0094 does is it looks at it from a global standpoint if we'd looked at all actinide monitoring together, so that would be americium, plutonium -- americium, curium, californium, and plutonium type of bioassay. And what we have found is that the vast majority of the subcontractor construction trades workers, especially in the 19080s, have monitoring data.

They both have typically plutonium and fission product monitoring bioassay, which is the two dominant exposures at the Savannah River site. And so that's the bulk of the subcontractor monitoring data that we have within the claimant files. There are

those who were monitored for americium, curium, californium. But it's not as prevalent, let's put it that way.

When we do dose reconstruction, the areas where americium would potentially become a potential issue is the 773-F, the 773-A area and the F-Wing, and the MPPF, the multipurpose processing facility. Everywhere else, the americium is tied to the plutonium, and we assign currently americium doses to these workers, to these subcontractor construction trades workers when we're doing dose reconstruction.

So those are currently being done. I hope I answered your question. If I missed something, please let me know and I'll try and fill that blank in.

Member Ziemer: No, I was trying to get a feel for the extent to which we could determine from claims that have already occurred the extent to which there are big chunks of missing data.

Dr. Taulbee: There's really not, to a large -- oh, I shouldn't. I can't -- that's something we could certainly look at. But I am afraid I could speak out of turn here.

In my recollection of looking at a few in RPRT-0094 going through is that there was routine monitoring almost on a per-year basis for plutonium, or you know, every three years at least, like on the bioassay frequency. So there isn't this big gap that a co-exposure model would be needed for. Does that help?

Member Ziemer: Yes, thank you.

Chair Clawson: Okay, I'll get back to what I've got going on. I don't feel 0092 met what it was set out to do. I don't think that it's there. I move that we push for an SEC from 1972 to 1990 for construction trades subcontractors. And this is to the Work Group, not to anybody else. I've got Jim and Phil. Do I have a second?

Member Schofield: You got a second. I mean, I think we need to call it at some point. It's, like he says, 13 years, we need to call it.

Chair Clawson: Well, this -- everything's been leading up to this, everything's been leading up to 0092. And it is where it's at. I don't think that we've got it. I think it's something that we need to take care of now. So I move that we take this to the full Board.

Member Schofield: Second.

Member Lockey: Hey, Brad, this is Jim Lockey, how are you?

Chair Clawson: What's that? I can't hear you, Jim.

Member Lockey: Hi -- Jim, this is Jim Lockey. You know, I think, you know, this is a very, very difficult subject, and I think there's a lot of value judgment that has to go back in making a decision one way or the other.

But I think what concerns me most is that it has been 13 years. I don't think we're going to resolve it by going through additional data going forward in the future. And I think under those circumstances, I would agree with you.

Chair Clawson: Understand. So Rashaun, we need to -- the SRS Workgroup is moving to make this an SEC from 1972. I'll have to sit down and write up the paperwork on this of what it's going to come down to. But I'm looking at just the subcontractors construction trade workers from 1972 to 1990.

I think it'd be January 1 that I've got to the December. And we'll take a look at the '90 to '97, what I call the Westinghouse years. We will take a look at that later, but I think that we need to take this to the full Board at this time.

Dr. Taulbee: Brad, if I may, may I ask a question or a clarification?

Chair Clawson: Sure.

Dr. Taulbee: Is this the dose reconstruction is not feasible for all radionuclides from 1972 through 1990 for all internal radionuclides, or is there a specific?

Chair Clawson: I think more towards americium is what I was looking at.

Member Lockey: Yeah, I would agree with that.

Mr. Fitzgerald: I guess the only, I don't like to slow any momentum on this, the only question is the Finding Two, where the specific source term is indeterminate in a lot of cases. How would you differentiate those subcontractors that in fact, you know, did or did not get americium?

I mean, how would you know if in fact the source terms were not specified, nor could you predict? I'm just throwing that out because that was Finding Two.

Chair Clawson: So Joe, how would we -- how would we word this? This is, you know, you guys have been the ones that have been working on this too.

Mr. Fitzgerald: Well, I don't think you can distinguish because you're lacking that information. I think for that earlier time period, the job plans and the SWPs did not specify a particular target nuclide. Much of the effort that NIOSH undertook was to find a way to assume what that would have been using, you know, Farrell and Findley and looking at the facility.

You know, it's not something that is self-evident from looking at the permits. So I don't think you can in fact decide that this particular sub was on americium and this was one was not. There's certainly a chance that you would have those that lacked bioassays that were on -- did get exposed to americium.

But you would have no way to determine that because their job plans and their SWPs did not say, didn't stipulate. So it's really any subcontractors who had potential exposures, basically.

Member Lockey: Joe, I thought they were curious,

they separated americium. Is that not correct?

Chair Clawson: What's that?

Mr. Fitzgerald: There was separated americium. But I'm just saying that there would be no easy way to distinguish those that might have been exposed doing whatever specific tasks they were doing to, say, americium or fission products or anything, because none of those job plans or SWPs stipulated any nuclides per se.

And much of the work we've been doing is just to basically come up with assumptions on what the source terms would have been for workers at certain locations. But that's not anything specific.

Chair Clawson: So I guess it would be for all internal.

Mr. Fitzgerald: Yeah, it'd be all internal. And you know, just to go back to a comment that John made in his presentation, you know, he was saying that well, in response to the Tiger Team, I think Westinghouse pointed out, this is in the 90s, that, you know, that the workers were relying on their familiarity and expertise to decide, you know, what nuclides would be, you know, of concern.

It was an expert-based system. It didn't go into a analysis-based system until the mid-90s with the, and we're going to be talking about that next, with the recognition that the expert-based system and the tables they were using weren't reliable and weren't being kept up to date. There was an over-reliance on them and they were static.

So this whole question of who was exposed to what I think is a legitimate question before that upgrade. And certainly that was the problem that DOE headquarters identified prior to 1990. There wasn't a clear idea in terms of the bioassay types and frequency on what people were actually exposed to in actual operations.

Chair Clawson: Okay, is there anything else that we

need?

Dr. Roberts: Okay, so this is Rashaun, Brad. So just to be clear, what you're recommending is that we bring the recommendation to the Board to add, you know, this SEC, to this as an SEC Class.

Chair Clawson: Correct. We as a Work Group have done this, but it's got to go to the full Board for their vote. And there'll be the usual verbiage of the 250 days and everything else like that.

Member Beach: Brad, this is Josie that the -- what you bring to the Board, you can work that out and send it around to the Work Group.

Chair Clawson: Right.

Member Beach: Is that correct?

Chair Clawson: Yes, I'll -- I'm trying to think of, because we're going to have to exclude the primes, and I've got to spend a little time and look at that. Maybe I can get Joe or Bob to help me with that.

Member Ziemer: Keep in mind also, this is Ziemer, keep in mind that you're going to have to specific what can be reconstructed during that period. Because you may have individuals who don't meet the 250-day limit for whom doses may, partial doses may have to be reconstructed.

And for example, we're going to have to address medical dose, external dose. And if there are some internals that can be reconstructed, you have to specify those so that you're being fair to those who don't meet the, or don't have the proper cancer for the SEC.

Chair Clawson: I understand, thank you, Paul. Yeah, I --

Member Ziemer: NIOSH is going to have to help with that, I think.

Chair Clawson: Yup, I think they can, so.

Dr. Roberts: Okay, so then this will go, we have a full Board meeting the 8th and 9th, so this will go on for potential vote.

Chair Clawson: Correct.

Dr. Roberts: Okay.

Chair Clawson: There'll be a presentation for us, and be able to give the full Board the opportunity to ask questions and understand this better.

Joe, if I could ask of your help to be able to help put this together, make sure that we make this the best we can. We can send it to NIOSH and Rashaun and --

Mr. Fitzgerald: Yeah, I think it has to be vetted pretty carefully. This complicated, as we found out at Hanford, subcontractors, if you're carving them out, that's difficult. So it has to be --

Chair Clawson: Yes, that's right. And --

Member Ziemer: One other thing, Brad, Ziemer again, if I could suggest. I know there's a big frustration with the time element. But in essence, we have not really based SECs on how long it's taken to resolve an issue. So --

Chair Clawson: No, Paul, and I understand, I understand that.

Member Ziemer: I think to take this to the Board, that it's not simply the fact that a lot of time has gone by. We need to make sure that it, I think what you're saying, or I understand that, and again I'm not part of the Work Group, but from the SEC other Work Group point of view, we have to have a good rationale for why additional work won't resolve the problem. Know what I'm saying?

Chair Clawson: Yes, I do, and I understand that. But at some point, time does play into it.

Member Ziemer: I understand that too. But we've

never used that as a sole criteria for an SEC.

Chair Clawson: Right, but we --

Member Ziemer: I mean, it's always been -- it's always kind of been the background, but we also have to say, yeah, we've reached a point where we don't think further studies are going to resolve the problem, something to that effect.

Chair Clawson: Right.

Chair Anderson: I would agree. This is Andy, I would agree with that. I think we just, or you have to put into this that exhaustive searches have been for additional data and what data you hoped for didn't come out of those boxes. And therefore we don't think that additional searching is going to resolve the issue to make the coworker model issues come up to what our expectations were. So it's --

Chair Clawson: Yeah.

Chair Anderson: -- The availability of data, yeah.

Member Beach: So I have a comment.

Chair Clawson: I understand that.

Member Beach: Brad, I have a comment for you.

Chair Clawson: What?

Member Beach: I have a comment for you and/or maybe Rashaun. I think you have one more member of the Work Group that's not online. Would it be feasible to get his opinion so you can go forward with the full Work Group recommendation? Or does that matter at this point? I'm just curious.

Chair Clawson: Well, if he decided not to, it'd be three to one anyway, so I don't know that it would be that much. I think that he should be involved in it and let him know what's going on. But he'll have the same opportunity when it comes to the full Board to be able to discuss and review what we've got to put forth.

And I'll need your help, Joe, on putting this together, because I think it's going to be you're right and I'm on the Hanford Workgroup so it's, I know what we're going to get into this. But we need to both put something together to be able to push around to the SRS Workgroup, and then we'll put it out and go from there. I'll get Rashaun to be able to help us with that, go from there.

Member Roessler: Brad?

Chair Clawson: Yes.

Member Roessler: This is Gen, I'm on the SEC Workgroup.

Chair Clawson: Right.

Member Roessler: And I've been sitting for several hours listening to all of this, and this is a really complex site. And I was looking forward to hearing the rest of discussion on this before coming to any kind of conclusion myself. And I think maybe other Board Members who haven't been involved in even that much will find this very difficult to understand and to vote on.

And I guess I would make one suggestion that as you put something together, and certainly Paul and Henry have made some good comments, but as you put it together, maybe you want to not only present your draft to the SRS Workgroup, but also the SEC Workgroup to get comments.

The Board might feel you're rushing things a bit, in spite of the fact that we identify with your frustration for this having been a long time.

Chair Clawson: Well, you know, and look at this too, you know, let's say we -- it's a year turnaround every time. And there is no more information. We have beat this to pieces.

But Gen, I take it under advisement, I'll see what we can do to be able to put this together, be able to bring

it into a rational situation. Maybe give a little bit of a background of where we're at and why we feel where are at now and why we're pushing for an SEC.

And then I think that because I understand this is just like any of the other SECs or not passing SECs coming forth from every Work Group there's -- we will not be able to cover everything, but we will give it the best opportunity we can to be able to explain why we are where we're at and why we feel that this is the best path forward.

Member Roessler: Are you actually suggesting that the rest of the agenda for today and Friday would not be completed?

Chair Clawson: No, because I don't think that 0091's really going to add anything into it. It's going to be good information, we're going to get a lot more in there. But it is still not going to come to terms with completeness. If you've read 0091 and stuff it's, I don't think that it -- I don't think it will.

Member Ziemer: What about the Friday materials?

Mr. Barton: This is Bob Barton. I think I can comment on that a little bit. There's really I think, well, there's four items really. There's some mop-up activities based on the coworkers models, sort of bringing those to close. There are two issues, one is global for the entire program, one of them applies to all the workers at SRS.

And then the fourth one is the question of stratification for subcontractors, which may be moot at this point if the Board chooses to go forward with an SEC. Then you know, we're not going really be stratifying coworker models for subcontractors because they're already a cohort. So I don't think the Friday material necessarily impinges on any recommendations made about RPRT-0092 here.

Dr. Taulbee: This is Tim. I somewhat agree with what Bob is saying. I think the speaking to the observed differences, the quantitative comparisons of the

DuPont construction trades to the subcontractor construction trades actually does speak to this too a bit with regards to when we combine them and that we don't see any difference there.

And here you're designating an -- or proposing to designate an SEC, actually I think you already have recommended coming out of the Work Group, to designate and SEC for the subcontractor construction trades workers. And so I do feel that that data is relevant. But that's just my opinion. It's your call, Brad.

Chair Clawson: So what you're saying, Tim, is that this SEC could involve more people that just if we find the data with the subcontractors and if we stratified this? Is it going to change -- is it going to change what we've come up with on 0092?

Dr. Taulbee: From the standpoint of completeness, no, it's not going to change that. From the standpoint of are the subcontractor construction trades worker different, are exposures and how we model them in co-exposure models different from the prime construction trades workers? Yes.

Chair Clawson: Well, and I'm not saying that we won't have the other meeting and stuff like that. But, maybe by that time we can have something brought together to be able to bring a little bit more clearance to this. But the bottom line is it still comes back to the completeness. Now, the other part of it that comes into the dose reconstruction, yeah, I understand that.

Mr. Barton: This is Bob Barton. I guess what I would say to that is if the underlying premise is that we don't have complete data for subcontractors and that's the impetus for the SEC, comparing the data we do have, I mean, what does that really get us? I mean, if we're saying that the data set is incomplete, any comparisons would seemingly be of somewhat limited value, I think.

Again, if the premise is accepted that we don't have

complete data and thus we're missing workers that should have been monitored. Well, now you're comparing just the data you have, which if it's incomplete, I mean, again, what can we really draw as far as conclusions on that?

Chair Clawson: Thanks, Bob.

Dr. Roberts: Okay, so what again are we doing for the rest of the agenda today and the agenda set up for Friday?

Mr. Fitzgerald: I think RPRT-0091 will go, and I hesitate to say this, relatively quick. So maybe if we can finish it within the hour, I think our presentation will take about 10-15 minutes.

Chair Clawson: Okay, so what do we want to do? I think I'm -- personally I think that we still need to be able to, you know, there's some overarching stuff in there. What about -- what about the next meeting on the 20th? Is that going to buy us -- do we still have -- this is all pertaining to SRS.

Mr. Barton: I think a lot of the, and this is Bob again, I think a lot of the items on the docket for the 20th are sort of separate from this. One discusses americium again, but that would be applicable to the entire site. One of them discusses a method called multiple imputation, which is how you deal with censored datasets and co-exposure analysis.

Again, there's a couple of very quick mop-up items related to discussions about the co-exposure model that from back in last December. The only one that may not be applicable is the stratification issue, if in fact the Work Group's going to recommend an SEC for subcontractors.

Because, again, if we're going to say doses are not -- dose reconstruction is not feasible for subcontractors, then you're not going to stratify any sort of coworker model because it's already been determined to be infeasible.

Chair Clawson: I understand. So let's go ahead and we'll --

Member Beach: This is Josie, sorry -- this is Josie, sorry for interrupting. What about the later years? Because you're just talking through '90, correct?

Chair Clawson: Correct. We'll have to address that as a Work Group. I think that we've been -- we've got to take this in little bit smaller bites. But that being said, let's go on to NIOSH, they've got the Report 0091 but --

Member Beach: Could we -- could I ask for a break? We've been at this for about three hours another --

Chair Clawson: No, what the heck do you think's going on, Josie, this is -- yes, that'd be fine if we want to take a comfort break.

Dr. Roberts: And how long are we going to have that break for?

Chair Clawson: Ten minutes should be good.

Dr. Roberts: Okay --

Chair Clawson: I thought for 60 seconds.

Dr. Roberts: Okay, so back here at 3:20.

(Whereupon, the above-entitled matter went off the record at 3:09 p.m. and resumed at 3:20 p.m.)

Dr. Roberts: Okay, I have 3:20, so again I'll do a quick roll call. One minute.

Okay, so Brad, are you back?

Chair Clawson: Yes, I am.

Dr. Roberts: Okay. Jim Lockey. Jim Lockey, are you back?

Member Lockey: I'm back. I'm Jim Lockey. I'm back.

Dr. Roberts: Okay, fabulous. And Phil, are you back?

Member Schofield: I'm back.

Dr. Roberts: And Anderson.

Chair Anderson: Yes, I'm here.

Dr. Roberts: Beach?

Member Beach: Yes, I'm here.

Dr. Roberts: Gen?

Member Roessler: I'm here.

Dr. Roberts: And Paul.

Member Ziemer: Yes, I'm back.

Dr. Roberts: Okay, great. It looks like we've got everybody. And so Brad, I believe we're moving on to the second part of the agenda at this point.

Chair Clawson: Okay. Sounds good. Thank you. I would like to welcome everybody back. We're going to proceed on. NIOSH is going to give their present on 0091. And I'll turn it over to you, John.

NIOSH summary of RPRT-0091 (missing or incomplete americium exposures between 1971 and 1999)

a. NIOSH Presentation

Dr. Cardarelli: Thank you, Mr. Clawson. I'll just try to make this quick, given what we just went through. And I know it's been a long day, so I'll get straight into it.

This is a summary of the report that has not yet been presented to the Work Group, but the documentation has been shared on the evaluation of the Savannah River site americium-241 source terms between 1971 and '99, particularly using the bioassay frequency tables.

Again, I'd like to acknowledge the primary authors, Mike Mahathy and Roger Halsey, who are also on the

phone. So if we do get into detailed questions, I will probably lean on them to help provide it.

The report itself is broken up into a brief background and then six sections. Near the end of this particular presentation, there's five questions that have kind of evolved over the last iterations between NIOSH and SEC, and we ask and answer questions and I believe that Mr. Fitzgerald will come in with another response to our response on those types of questions, and then we should have this covered.

Also, I point out the time line again. The SEC Class 103 goes from '53 to about '72 or '71-ish. I think it was March or something. And ORAUT-RPRT-0091 starts around 1971 and goes through '99.

To the background. November 14, 2017, SRS Work Group meeting, SC&A stated concerns that workers were enrolled in incorrect bioassay programs before 1999 and that some of those workers were exposed to unrecognized americium-241 sources.

In January 2018, their memo, Missing or Incomplete Radiological Source Terms, included the five questions that I mentioned earlier, and we'll get to those.

About a little over a year and a half later, Report 0091 comes out to address this and it addresses the issues raised in that January 2018 memo and then about eight months after that, January 23rd, SC&A came out with a review of our report. They didn't really have any observations or findings or new concerns, but they did add responses to our five questions and that put us in a situation where we weren't quite sure how to handle these as are they findings? Are they observations, and what weight do we give them? So we treated them as if they were findings and just tried to provide responses to them in that context.

October of this year, we sent out a memo which was our responses to those five questions. The introductions probably, what was the driver for the report which was underlined here in this particular

statement. I won't read the whole thing, I'll just read the underlying section. Lack of proper specification of radionuclides of significance for internal dosimetry may have led to unmonitored exposures for which dose reconstruction with sufficient accuracy may not be feasible. And then obviously, we should further investigate that.

Part of the big picture is to kind of understand the operating contractors, and this is kind of a big picture slide showing that when the reactors R, P, K, L, and C came on board, it pretty much stopped operating in the late '80s, predominantly production-type error and you have the F Canyon and the H Canyon. The F Canyon stopped, started.

There was somewhat of a start up effort in the '90s during the Westinghouse era, but I'm just giving you a big picture view of kind of the work activities over these several decades.

Again, another background slide to help better understand what was going on with regard to the regulations, operating philosophies, how they did monitoring. So we put it in the context of what was required at the time. Of course, it starts with the Atomic Energy Commission in charge up through 1974, based a lot of monitoring based upon maximum permissible body burden.

And then NRC and ERDA came in '74 to '77. Department of Energy became a player in 1977, which replaced ERDA. And then a few years after that, DOE 5480 was like the first order that came in which starts setting monitoring requirements based upon a dose. And that was further refined in 1989-1990 period with 5480.11 coming in. Of course in '95, 10 CFR 835 takes over.

So a lot of dynamic changes with regard to the requirements that they had to meet under the regulations or the orders or the expectations. The drivers for that were all different over this time period.

This is just a slide showing what were the basic drivers for the monitoring requirements -- 10 percent of the quarterly limits all the way down the 100 millirem per year combined, and that is followed through also with 10 CFR 835.

You saw this particular slide in the previous presentation. I won't go over it, but again it just how the bioassay control procedures were in place and all work was done by mostly DuPont construction trade workers under job plans up through about '74-'75. Lots of chest counts and whole body counts began to replace the fission products, but we're here to talk about americium.

The Defense in Depth operating philosophy, I wanted to point out with Westinghouse Era, that same operating philosophy was applied in the DuPont era. It just wasn't called Defense in Depth, and that is in essence where they used engineering controls, administrative controls, policies like the zero exposure policy, things of that nature. Basically, the same with regard to protecting workers.

So the internal dosimetry section, the self-assessment, this covers the DOE Office of Enforcement, where they issued 31 general deficiencies in July 1999 and asked all contractors to review their programs.

Not all 31 of these deficiencies was associated with the site. I think only 18 basically were and the one that is really pertinent to this discussion is Item B.8, workers enrolled in incorrect routine bioassay program.

So the SRS provided a response for this, and they previously identified some workers potentially exposed to americium that were not included on the RWPs. They recommended changes and the memo, Specification of Urine Bioassay Requirements on Radiological Work Permits, was submitted.

So the key here partly is to understand there's also an ingrowth of americium-241 to the plutonium

mixture, so when you're in a production phase like the DuPont era, you're dealing largely with fresh plutonium with very little to no americium ingrowth. As that plutonium ages and you're no longer in production and now you get into storage, the americium will begin to grow in and become a potential dosimetry radionuclide of concern. So we do address that in our dose reconstructions, as you can see here. We make assumptions that it's fuel grade, usually after 10 years, and it gets at least 10 percent of the committed effective dose.

So there's a true account for this already in a claimant favorable dose reconstruction effort for individuals. That's built into the whole dose reconstruction process.

Separated americium, a little bit different from plutonium, existed in a few areas we talked about, the MPPF and the 773-A, where plutonium is not the primary dosimetry of concern, just the americium is.

So we summarize that, Section 3, we talk about the whole body counting and the bioassay monitoring, and here is just a big picture timeline of the types of technology that were used to conduct whole body monitoring. It started with a Phoswich chest counter, predominantly looking for americium, but it could pick up -- I can't say it -- californium and curium. And then in about mid-'82, '83 period, they started germanium counters, but kept the Phoswich active as a backup to that, and then they improved the germanium counter system in the '90s.

The other thing I wanted to point out here is that the bioassays in around 1986 or '87 period, anything that had a significant detection, or if there was an incident where americium was found to be positive, they would do an isotopic analysis to verify and validate that. That basically answers a question: how do we know that there aren't already radionuclides that could have been potentially exposed, that they weren't monitored for? Because that would have been captured in that context of an isotopic analysis.

Prior to that, it was predominantly just either gross gamma or gross alpha type analyses to my understanding, so if I missed any of that, I would ask that Tim speak up, but I think I've captured that right.

Another concept that they started was called the Fastscan Whole Body Counter for fission products. It came in about '89, and then you'll see a big jump in some of the data at that time period. But chest and whole body counts, what we see here from 1972 to 1985, this is combined together. The data did not exist in a separate format, so I can't split these out, but these are the folks who have gone through it. Quite a substantial amount of data exists.

Then we go from '86 because the previous ones stop at '85. Now I'm picking up from 1986 to 1992. We have whole body count data and then chest count data. So you can see that the numbers start at 5,000 here and go up to 30,000, and then the slide before it just went up to 3,000. So there's an explosion in one respect of -- probably a bad term, but there was a significant increase in the number of whole body count and then chest count data that began to occur in the mid-'80s, especially starting in the '90s.

So what's the purpose of the SRS Routine Bioassay Programs? Again, I said before, it's not used to assign dose. It's used to monitor program effectiveness. The program included the items listed here: engineering controls, air monitoring, surface contamination, personnel monitoring, all of this is pictured in this phrase called the Defense of Depth concept that is kind of in quotes with regard to the Westinghouse era. This also applied during the DuPont.

So any positive result triggered special bioassay. That's what would be used for dosimetry analyses.

The bioassay frequency tables were the method used to identify the locations, analytes, how frequent we must monitor these workers and the participants who need to do it. Typically, they're annually and you'll notice that the tritium, plutonium, strontium,

neptunium, uranium, enriched uranium, fission products, and americium, curium, and californium are together. Those seven or eight radionuclides of interest, I'll call them, basically account for 90 percent of the dosimetry issues at the site. So those -- and there's monitoring across the site for all of these. Anything not on that particular list was considered not to be dosimetry -- of dosimetric importance with regard to regulatory measures.

So whole-body counts, chest counts, category. They did a category-based program which I'll talk about in the next slide, and then RWPs which Westinghouse started in '92. That's where the workers' responsibility is to follow through and some workers simply didn't, and that's part of the challenge is you can't force a worker always to leave the samples that they're supposed to leave. That was a challenge.

So here are the categories. I will not go through all of them. I will just point out Category III -- Categories I, II, and III. And Category III is the personnel who were not required to routinely enter radiation control areas where protective clothing was required, and who were not performing tasks requiring work in contamination or airborne radioactivity areas.

So Category I is the person who wore the respirators. And Category III was pretty much the general folks who wouldn't go into these areas. And you were selected based upon a frequency of your risk of exposure or potential of exposure.

So the purpose of the special bioassay is to assign the dose, triggered by routine bioassay results or air sample results, or as we saw in the previous presentation, surface contamination, nasal contamination, or any incident that might occur.

They're designed to assess the inadvertent intakes. They require an investigation to establish the source term and you can see after 1986, they did isotopic analysis to verify the specific isotope that was contributing to the contamination. They did not use

the bioassay frequency tables for these types of monitoring.

Section 4 is the americium, curium, californium source terms from bioassay frequency tables. On the left, you see the year, 1971 all the way through 1999. And it shows examples where americium-241 only was a routine, required on the routine urine bioassay requirements.

As you can see as we talked before, 773-A is listed just about everywhere. And you can see in the '90s, I'll point out here, you get a lot more different waste streams and things that have been characterized as a result of the Farrell and Findley document, and also a change in the actions at the site from mostly production to waste characterization, environmental cleanup. So there's a fundamental shift in kind of what the entire site was doing at the time. That's where you see this change in the '90s.

Dose reconstruction considerations. Americium-241 is a decay product of 241, monitoring one, either americium or plutonium. You monitor them both, assuming the key point here is americium has not been chemically separated from the mixture.

So the 1999 memo listed three sources where americium was listed as a routine bioassay, and plutonium did not contribute more than 10 percent of the dose in those areas. And that was the californium waste stream, the F wing boot waste stream, and MMPF in 221. So that's just kind of pointing out where americium alone itself could have been potentially present.

For the MPPF, the multi-purpose processing facility, which was in Building 221-F, no americium requirements in the bioassay frequency tables between 1989 and 1999. Why? Because it simply wasn't used. It was there, but not used.

It was used in 1995 for demonstration of a vitrification project, but it really did not have large quantities where exposures were going to be

significant or potentially significant. So we reviewed eight RWPs for the MPPF for the work in 1996 and '98. Everyone on those RWPs had americium, plutonium, and strontium listed on their routine bioassay requirements. This is the era where RWPs started to really list the radionuclides of interest. Thirty-four individuals signed in, and 29 had americium routine bioassays within four and a half years of the RWP. Five had no bioassays for americium. But each of the five had coworkers on the same date, the same RWP, with an americium bioassay result which effectively would mean 100 percent coverage.

Other parts of the dose reconstruction program. The air sampling which could trigger special urine bioassay, plutonium was the controlling limit for most radionuclides or for the radionuclides for dose. In the '70s and '80s, Radiation Concentration Guidelines were used to determine whether or not you've got to give us a special urine analysis. In the '90s, Derived Air Concentrations took over. So again, we have a change in the types of criteria by which would trigger a special.

NOCTS Chest data is available if we need it. It was used and can be used to reconstruct doses for americium. We have more than 1,000 chest counts of americium of 469 workers just for the decade of 1990 to 2000.

So routine or special urine bioassays, we have over 14,000 urine bioassay results from '71 to '90. The majority of them are routine --- 5,000 are routine from '91 to 1999 alone, and about 1,500 are special in that same decade of the '90s.

The routine bioassay is not required in a bioassay procedure. Areas with the americium contamination, but not listed in bioassay procedures were covered by the RWPs.

(Audio interference.)

So on to conclusions. So the SC&A statement, lack of

proper specification of radionuclides of significance for internal dosimetry may have led to unmonitored workers for which dose reconstruction with sufficient accuracy may not be feasible.

So our report focused on the potential americium, a decay product of plutonium for the time period '71 to '99. Both radionuclides were detected by various methods: air, surface, skin, nasal contamination, routine or special urinalyses, and in vivo counting.

Dose reconstruction, we believe, is feasible with sufficient accuracy for compensation purposes due to the availability of these data.

b. Joint SC&A and NIOSH presentation

Now we are going to get to the point in the presentation where there's questions that have been by SC&A. I'll present our answer and then I'll zip over to the slide for Joe to provide his response to NIOSH's response. Is that okay, Joe?

Mr. Fitzgerald: That's fine.

i. SC&A presents its responses (issued in January 2020)

Dr. Cardarelli: Sounds good. Okay, the five questions were: what are the ramifications to dose reconstruction? What's the completeness of the pre-March 1999 bioassays? Third question is worker enrollment in bioassay programs. The fourth question is the facility source term characterization and adequate internal dose. And the final one is ramification of missed dose radionuclides.

So what does this all mean with the big picture with regard to our ability to reconstruct doses? I won't read the question, but I will read the answer. So on the ramifications to dose reconstructions, our response is basically the relevant radionuclides were included in the bioassay program. There were relatively few changes in the bioassay program by area from 1971 through '99 with the exception of

americium as discussed in Section 4 of this report, those two areas. NIOSH believes that dose reconstruction can be done with sufficient accuracy for compensation purposes.

At this point, I can turn it over to you, Joe, and you can provide a response to that, we can move on, or I'll zip on through the other four --

Mr. Fitzgerald: No. Let's just do the questions real quick. That would be more expedient.

First off, these weren't findings.

Dr. Cardarelli: I can't hear you.

ii.NIOSH present its responses to SC&A comments

Mr. Fitzgerald: Oh. Can you hear me? Hello. All right, good. These were suggested lines of inquiry. Very simply put -- what's that? Hello?

Let me continue real quick. Yes, these were suggested lines of inquiry that came from a question. We raised a very simple question during a Work Group meeting that in the course of our Report 0092 review, we came across a Westinghouse self-assessment where they identified americium as being ---

Dr. Cardarelli: I understand that everyone can hear you, Joe, except for me.

Mr. Fitzgerald: Okay.

Dr. Cardarelli: For some reason, I'll work on that, but give me thumbs up if we want to go to Joe's answer to that. Okay.

Mr. Fitzgerald: This will be interesting. Yes, so frankly, it was a question that we raised ---

(Simultaneous speaking.)

Dr. Cardarelli: I have to find out why I cannot hear.

Mr. Fitzgerald: I can hear you, John. It was a

question we raised about a self-assessment Westinghouse had performed where it identified americium as not showing up for a couple of facilities and therefore the potential for workers not to be enrolled in the correct -- for the correct nuclides in their RWPs. We flagged that to the Work Group and said this may have implications. The Work Group just simply said, you know, well NIOSH wanted the references. We provided those. And then the Work Group suggested that we write down the concerns and we did that in a memo. We weren't asked to investigate, just to identify the concerns.

(Simultaneous speaking.)

Mr. Fitzgerald: And these questions are simply suggested lines of inquiry -- all right, suggested lines of inquiry that NIOSH could follow in the course of doing the investigation that they were going to pursue. So these weren't findings per se. They sort of came back that way, so -- and we had a dialogue.

But I'm going to tell you in general that really the fundamental question was whether one could dose reconstruct with sufficient accuracy if, in fact, you had these specific americium issues. NIOSH satisfied us from the standpoint of demonstrating that that would not be an issue for the two facilities in question that were flagged in the self-assessment.

So that removed the fundamental question that we had relative to dose reconstructability. What was left is these questions -- they were kind of programmatic questions that we posed as lines of inquiry. The first question was ramification of dose reconstruction. We suggested that that would be one implication that ought to be addressed. And the response was that NIOSH felt that there would be no ramifications to dose reconstruction from '71 to '99.

Well I'm not going to reiterate everything we covered in the '92 discussion, but we felt that clearly that source terms were not necessarily identified adequately in the DuPont years, and I think we did discuss that under finding two, and that's kind of our

position on that question. And that's where we left it on question one.

But I think what you're going to hear is the response on almost all of these -- there's five questions. They're going to be about the same, that you know, in terms of the implications, I think NIOSH's position is that there are no implications for dose reconstruction or completeness analysis, and we feel otherwise primarily for the '72 to 1990 time period.

So we can go through this, but I think I want to put this in perspective that these programmatic lines of inquiry that would be guiding an investigation, I think have been -- have been pursued. We've agreed to disagree that on the implications for the DuPont era. And I think we've touched on most of those considerations in the previous discussion. I would not want to drag you through that again.

So I'll just leave it there, and like I said it was a question that came up in our review on a Westinghouse self-assessment. It wasn't one that we raised independently. And we felt the fundamental question was settled by NIOSH for the two facilities in question.

The programmatic questions or the lines of inquiry are pretty much the same as the ones we just discussed in the Report-0092 dialogue. So that's my capsule for the whole thing. And we did generate a response and NIOSH generated a response, but I don't think there's any fundamental disagreement on the outcome and where we have differences, I think we have laid those out in the response to 0092, particularly in finding 2.

Dr. Cardarelli: So I'm back now. I can hear. I can hear you, Joe.

Mr. Fitzgerald: Okay, good. I kind of touched on how we dealt with the questions and the bigger picture, John. I don't know if you caught much of that.

Dr. Cardarelli: No, I did not. So should we go through

them, is it worth ---

Mr. Fitzgerald: Okay. Just for your benefit, I just wanted to emphasize that the fundamental question which was the dose reconstruction with sufficient accuracy for the two facilities that were flagged by the Westinghouse self-assessment, I think NIOSH's response in '91 was more than adequate about the fact that, you know, for one facility, I can't remember which one it was, but it wasn't really in operation until later, 2004 I think it was. And for the other you could, in fact, rely on plutonium in vivo bioassay as a means to ascertain what the exposure would have been. So that was essentially a work-around that provided sufficient data.

So the specific question that we had which was the implications for dose reconstruction per se, I think went away. The lines of inquiry or questions that we provided to help to guide NIOSH on the investigation, we really weren't making findings, but since they came back with responses, we expressed some differences on the conclusions, the programmatic conclusions, but they're not that much different than what we just discussed in the RPRT-0092 dialogue. So I guess I would propose that unless you want to touch on anything specific, I don't see any real benefit to walking through things like Farrell and Findley, walking through the source term identification for job plans and SWPs. The ---

Dr. Cardarelli: I think we've covered everything in the big picture, as I'm looking at the responses to some of our questions. At this point, I will leave it to Tim because he's heard everything, or to my colleagues at Oak Ridge to see if I should go through the rest of the questions.

Mr. Fitzgerald: Yeah, the key thing to understand is that the Work Group had asked us to identify our concerns because I think the understanding was NIOSH was going to follow up, and the questions -- you know, we don't usually do questions, as you know, weren't meant as findings, but were lines of

inquiry that we felt were important in any investigation of that particular issue. So that's the context by which we identified these questions.

Dr. Taulbee: I don't have anything else to add from that standpoint. It's up to Brad as to whether you want to go through all of them or whether this is sufficient, up to Brad and the Work Group.

Chair Clawson: I don't see any added to it, but I want to make sure that anybody that has any questions will have the opportunity to be able to ask.

c. Work Group discussion

Member Ziemer: This is Ziemer. It's not really a question more than a comment. I think at the Full Board meeting, the Full Board will have the right to hear NIOSH's reasons why they think they can reconstruct dose. So all of these responses may have to be provided for the Full Board because I believe that for the Full Board to make a decision on this, they're going to have to hear both sides of these arguments.

Mr. Calhoun: This is Grady. Can you hear me? This is Grady, can you hear me?

Member Ziemer: I can hear you, Grady.

Mr. Calhoun: I have something to add here too, and it kind of goes along with what Paul was saying. Just so it's easier for the Secretary to administer this if it comes to that, to writing up something to help advise the Board or inform the Board. I think what you have to include in that is obviously a technical basis and specifically what, why do you recommended an SEC, and then if it's for americium, for example, or any reason, remember any reason that's used to establish an SEC to not be used to assign dose to anybody else of that Class. So anybody with a non-SEC cancer or anybody with less than 250 days, they -- you can apply that to them.

And then you said for '90, so it would be important

to come up with an actual date. If it's December 31, 1990 what changed, and what made you end it at that point? Who is covered? Clearly this whole discussion seems to follow construction subcontractors and not the general workforce. And so if you decide that that's what you want to be the population including the SEC, you need to define that. What are construction subcontractors?

And then it's also going to be important to somehow make sure that the Department of Labor can administer the proposed Class. So that will just make it easier I think for you guys to get this through, so I just wanted to point that out and let you know.

Chair Clawson: I appreciate that, Grady. And Paul, we'll something put together there and we'll discuss it between the Work Group, and then we'll send it out and get you guys' input on it, to be able to implement this and be able to forth with it. So appreciate that.

Member Beach: Brad, this is Josie. Do you think you might have that by our call on Friday or ahead of Friday?

Chair Clawson: You know, we'll sure give it a shot. But I'm going to have to get SC&A to be able to help me with this. Because I'm thinking in the '90 time period we get into some different primes in there at the beginning of Westinghouse and stuff, so I'll work with Joe and Bob and we'll go from there if that's all right, and we'll see what we can get before the Board.

Ms. Naylor: Brad, this is Jenny. I think it would be helpful for you to take a look at some of the definitions, SEC Class Definition packages that go up to the Secretary. And those are all publicly available on the website. And just take a look at the technical content that actually goes into the Secretary's report, and I think that would be a good basis for you guys to work on.

So that said, it's a pretty heavy and very dense document, so do take your time so we have a good product from the Board to the Secretary.

Chair Clawson: I appreciate that, and we'll take that into consideration. I was just thinking of all the different ones that we have put together and how each one of them has got their unique aspects to it. So I appreciate that, Jenny, and we'll go from there.

That being said, is there anything that we need to -- does anybody have any questions on 0091 that we've just gone over? Any questions for Joe or John?

Chair Anderson: No questions.

Chair Clawson: Okay, appreciate that. With that being said, we've got -- is there anything -- we've got petitioners down here. Is there any petitioners that wanted to say anything to the Work Group?

Mr. Johnson: Yes, sir. This is Warren Johnson. First, I'd like to thank you all for your efforts, and I certainly thank you for moving ahead with this portion of the SEC. And I assume the remaining portions of the petition will still be worked through in the future.

With that in mind, I also would add that there's been a lot of reference to the time and I guess a difference of opinion on what the meaning of whether the time frame of 13 years is relevant. Let me point out that Congress did say that the SEC should be granted if it's not feasible to bind the dose with sufficient accuracy. And feasibility certainly includes both resources, money, but also time.

The very purpose of the Act is to provide relief to the very people that supported our efforts in the Cold War, and they certainly -- the provision of healthcare as well as compensation, all of this obviously time matters. And so you can't view this solely in a vacuum. You have to consider the fact that it's taken 13 years and some great efforts by both the SC&A as well as NIOSH to attempt to bind the dose and confirm that you can do dose reconstructions and be sure that they're claimant-favorable.

Thirteen years and today we just had the

acknowledgment. It can't be done, at least as to the subcontractors. I would I guess respectfully request that you continue that consideration as it relates to all workers during the '72 to 1990 time frame and quite frankly on forward throughout the petition, but we've heard from NIOSH that the subcontractors and the other workers were treated the same.

The records don't exist. The point of '92 was to compare the radiation work permits to and what was required of monitoring to whether that monitoring actually happened and whether it was for the appropriate radionuclides and that information doesn't exist. We just heard NIOSH say that. We're missing critical information. You can't go back and create that information right now.

In addition to that, we've done -- as it relates to the other workers, we have numerous reports of deficiencies throughout the monitoring program. And instead of acknowledging that, we're just arguing around how there's other ways to find this information. The information just doesn't exist. And quite frankly, on behalf of the workers, I find the assertion somewhat offensive that we can't trust the anecdotal evidence or the witness statements from former workers that these records were destroyed. And that that must just not be true. Well that's simply -- there are many, many people who have provided that information.

But the second part is it really doesn't matter whether it was destroyed or whether you just can't find it. I've been in litigation at the Savannah River site for eight years now, and I deposed many people at the site. And the records custodian has told me that in many cases, she will not commit that the records are complete. Instead she'll say I think they are. And when we go through that, ultimately the answer and her quote was, they're not lost, I just don't know where to find them.

Well it doesn't matter. If you can't find them, you can't use them. And that's part of the problem is the

records aren't complete and again, I think we heard today from NIOSH confirming that the records aren't complete. That was the mission of 0092, and they conceded that it's failed.

So again, I appreciate what you all have done, and I just ask you to continue and consider expanding the SEC even further. Thank you for your time.

Chair Clawson: Thank you, Warren. I want to make sure you understand too. Both sides on this, they may not agree on paths forward and stuff, but both sides do take this serious, and the people at Savannah River are important to us. We're trying to get best product we can out to them, and to make sure that they are represented the best that they can. I know this from years of spending time here. And we will continue to keep going on this. This isn't the end of it. It's just sometimes we have to take certain sections so we can digest what we're actually dealing with.

Mr. Johnson: Yes, I certainly understand that, and I appreciate all you are doing.

Petitioner comments

Chair Clawson: Okay, anybody else here that's petitioners or anything that would like to make a comment at this Work Group meeting?

Work Group Discussion; Follow-up Actions

With not hearing any, we've got some follow up, but what I've got to help provide, and I'll need SC&A's help and probably NIOSH's too to be able to write up a bounding document to be able to bring forth. We'll try the best we can to be able to get it before this Friday, but there's a lot to digest into this, and I want to make sure we have the best product that we can get out to them.

With that being said, is there any other discussion that needs to come forth for the Work Group?

Member Lockey: Hey, Brad, Jim Lockey. I think this is going to be a complicated letter to write. I think it really needs to be very precise. So I wouldn't hurry on it, okay?

Chair Clawson: I understand that, Jim. And I won't write it, so you guys will be able to understand it because I'd hate a dangling participle put forward, or something like that in there, so we'll run this by all of you. This isn't just my thing. This is going to be all of us and a product that we're all good for, but we may have something rough that we'll be able to look at, okay?

Member Lockey: Okay.

Chair Clawson: Okay. With that being said, Rashaun, I think that we're good for the day if we want to adjourn.

Dr. Roberts: I think so. I think the path forward on the SEC issue is clear on the work that needs to be done in order to prepare the case, so with making that recommendation to the Board, some recommendations have been provided.

I think I will need to touch base with you and to see about the agenda for Friday. I'm not sure. So we probably just need to talk about what we want to cover on that agenda, along with you, Andy, as well. So I'll be in touch.

Chair Clawson: I've still got to get a hold of the IT center to try to get my computer fixed that died. So just give me a call, and we'll work through that. We'll just go from there.

With that being said, as always it's a pleasure to be able to talk with all of you, and until we can meet again, I look forward to it. This meeting is adjourned.

(Whereupon, the above-entitled matter went off the record at 4:08 p.m.)