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

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ADVISORY BOARD ON RADIATION AND
WORKER HEALTH

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WORK GROUP ON SAVANNAH RIVER SITE

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TUESDAY
NOVEMBER 14, 2017

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The Work Group convened in the Montreal Room of the Cincinnati Airport Marriott, 2395 Progress Drive, Hebron, Kentucky, at 8:37 a.m., Bradley P. Clawson, Chairman, presiding.

PRESENT:

BRADLEY P. CLAWSON, Chairman
JAMES E. LOCKEY, Member
JAMES M. MELIUS, Board Chairman*
PHILLIP SCHOFIELD, Member*

ALSO PRESENT:

TED KATZ, Designated Federal Official
MATTHEW G. ARNO, ORAU*
ROBERT BARTON, SC&A*
RON BUCHANAN, SC&A
JOE FITZGERALD, SC&A
STUART HINNEFELD, DCAS
JENNY LIN, HHS*
MIKE MAHATHY, ORAU
JIM NETON, DCAS

*Participating via telephone

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

(8:37 a.m.)

Welcome and Roll Call

CHAIRMAN CLAWSON: Thank you. I'd like to welcome everybody out today. It's been a long time since we've met face-to-face.

This meeting has come at a critical point. We've been at this for quite a while and I think today is going to be very beneficial. And I hope that everybody will listen intently and if they have questions, that they'll raise them.

And with that --

MEMBER SCHOFIELD: I'm sorry. Can the speaker move closer to a microphone, please?

CHAIRMAN CLAWSON: Sure. Does that help?

MEMBER SCHOFIELD: That's better.

(Pause.)

CHAIRMAN CLAWSON: Anyway, with that being said, we'll turn the time over to Tim and allow him to start.

DR. TAULBEE: Okay. Can everybody hear

me here? Okay.

I'm having problems here getting Skype Business to work. Apparently on my CITGO account I don't have the app loaded. So I was wondering -- yes, either Jim or Stu, do you guys have -- logged into the CITGO?

MR. HINNEFELD: I am.

DR. TAULBEE: Bring up the first presentations.

MR. HINNEFELD: Okay.

DR. TAULBEE: I can point to where it's at on the A: drive. Or you can go from the one that I sent yesterday.

MR. HINNEFELD: You sent the email, right?

DR. TAULBEE: Yes. The summary status and key issues.

For those that don't have access, I do have three hard copies.

MR. KATZ: While Tim's handing this out let me just say for members of the public that may be on the line, this is a presentation that's not cleared so it can't be shared at this point.

But we'll put it through clearance and after the fact it will be posted to the extent that it can.

DR. TAULBEE: And are we -- you're into CITGO, into the Skype meeting business meeting?

MR. HINNEFELD: I have not opened Skype, no. You want to put it on Skype?

DR. TAULBEE: Yes, I want to put it on Skype.

MR. HINNEFELD: Oh, so you want to share the screen on Skype?

DR. TAULBEE: Yes, I want to share the screen on Skype.

MR. HINNEFELD: So it's not loaded into Skype Meeting anywhere.

DR. TAULBEE: Show it as you want from your desktop.

DR. TAULBEE: But I don't have the app on mine apparently.

MR. HINNEFELD: Okay.

MR. KATZ: They just did the transition from Windows 7 to the new Windows 10, and so you have to have the app.

MR. HINNEFELD: So, did the meeting

announcement have Skype on it for today on account?

MR. KATZ: Yes, it does. It does. Ida sent that around. Everybody should have received that.

MR. HINNEFELD: Should have it.

MR. KATZ: Should have it. I can forward it to you otherwise.

MR. HINNEFELD: I have it.

DR. TAULBEE: I can go ahead and get started with this though. I've got the PowerPoint on here and we can go from the hard copy here.

MR. KATZ: Sure.

DR. TAULBEE: But we will get this uploaded to Skype for those who are dialed in on a CDC computer.

MR. KATZ: Yes. And folks that are in -- so I sent it to people who have a CDC account. But I couldn't send it elsewhere because it's PII.

DR. TAULBEE: So the board members who do have CDC accounts have this?

MR. KATZ: Well, yes. But I'm not sure if that includes anyone at this point, because --

MR. HINNEFELD: Phil and Dr. Melius, do you guys have the CDC --

MR. KATZ: Phil has a CDC account. I don't know if he has access to it.

MR. HINNEFELD: Do I want to use full audio or I just want to --

DR. TAULBEE: Don't use audio.

MR. HINNEFELD: Don't use audio.

MR. KATZ: Yes, don't use the audio. Don't play an audio.

MR. HINNEFELD: Is there anybody out there has -- can see the Skype presentation?

MR. KATZ: Maybe not. But there are people in here who can see it.

MR. HINNEFELD: So where do I want to go?

MR. KATZ: Well, let me just check, following up on Jim's suggestion, either Dr. Melius or Phil, are either of you attending by Skype?

MEMBER SCHOFIELD: I'm not, Ted.

MR. KATZ: You're not. Okay, Phil's not.

Dr. Melius, are you?

BOARD CHAIRMAN MELIUS: Yes, but not on CITGO.

MR. KATZ: Yes, but you're on, you're on the Skype session?

BOARD CHAIRMAN MELIUS: Yes.

MR. KATZ: Okay. So Dr. Melius gets this, yes.

Dr. Melius, if you could go into CITGO, I've loaded this to the --

BOARD CHAIRMAN MELIUS: I'm not on CITGO.

MR. KATZ: Oh.

DR. TAULBEE: Oh, okay. Then that's not happening then.

NIOSH Presentation summarizing status and key issues

All right. Thanks, Brad. And I apologize for these delays here.

What I wanted to do is kind of start

with a quick recap of how we got to where we're at right now because it's been quite a while, as you've pointed out.

So, I'm on slide 2. Overview, just gives a background, kind of a chronology of events. Short, very short recap of our job analysis plans. And then get into the key issues that were kind of identified this last August during our work group meeting, and talk a little bit about the 95th percent analysis for bias that we sent out just before the Board conference call the 1st of October.

So, as a background, the goal here is can we --

DR. NETON: Hey, Tim, I got it here.

DR. TAULBEE: You've got it there? Okay.

DR. NETON: I think I do. Looks like it's seven participants.

MR. HINNEFELD: Check for the -- people on Skype, can you now see it? I'm trying to present it on --

MR. BARTON: Yes, this is Bob, we can

see the PowerPoint.

DR. TAULBEE: Okay.

MR. HINNEFELD: I think they're mine because I just logged in to Skype and shared my screen and I've got the thing on my screen.

DR. TAULBEE: Right. Okay, good.

MR. HINNEFELD: Okay.

DR. TAULBEE: That works.

DR. NETON: Why don't you move it and see if it moves.

DR. TAULBEE: Did you guys see it move? Oh, yes, it did. I saw it here.

MR. BARTON: Yes, we're on the second slide now.

MR. HINNEFELD: Okay, never mind.

DR. TAULBEE: It's on Stu's, not yours, Jim.

MR. HINNEFELD: Well, I'm presenting.

DR. TAULBEE: Yes.

DR. NETON: Yes, I didn't present. I've got it on here but it's not --

DR. TAULBEE: Are we good?

DR. NETON: Yes, we're good.

DR. TAULBEE: All right. So -- and then we'll go through the 95th percent analysis for bias. So the background here is can we reconstruct doses to unmonitored construction trades workers with sufficient accuracy?

And our response has been, yes, through the use of coworker models. And this led to a discussion of whether there is sufficient data and whether stratification is necessary.

So, if you go back and look at this, their initial approach was to compare construction trades workers versus non-construction trades workers models to determine if there is a difference requiring stratification. So, in November of 2010 we issued Report 49, which was discussing the differences between tritium.

2011 a separate analysis regarding tritium.

2012 we looked at the exotics americium, curium, californium, and thorium.

And, again, we're comparing construction trades workers and non-construction

trades workers.

August of 2012 we issued a report on neptunium.

September of 2012 on mixed fission products.

These reports led to a discussion on general coworker models kind of in general. And this is where the SEC Issues Work Group came in. And in March of 2013 we discussed at a meeting the one person/one statistic methodology, and the statistical power to observe differences between these groups with regards to the stratification.

And this led to the request for NIOSH to write this down and issue a guideline on coworker models. And so then in June of 2014 Jim issued the Draft Guideline on Coworker Models.

March of 2015 the SEC Issues Work Group reviewed that particular guideline. And instead of the one person/one statistic we modified it to the time-weighted one person/one statistic methodology.

In June 2015 the Draft Guideline on Coworker Models Rev 4 was issued. The SEC Issues

Work Group generally liked the Draft Guideline of the Coworker Models but wanted to see a demonstration. And so that's where Savannah River begins to come in here. In August of 2015 we began work on the coworker model.

August 2016 we presented the schedule to the Advisory Board for the completion of the coworker model. We had been working on it during that past year and it was nearing completion. We were projecting it to be in October of 2016 that the model would be delivered in two parts.

The first part would contain the full models for tritium and for the exotics americium, curium, californium, and thorium for both construction trades workers and non-construction trades workers. So we were going to stratify.

The second part, Rev 4, would provide all other radionuclides.

Again, the goal with two parts was to allow the Advisory Board to review and comment on Rev 3 methodology such that if there were substantial changes we could incorporate them before Rev 4, before we went through all this

additional work.

Rev 3 is still being reviewed by the SEC Issues Work Group.

But there is still this lingering issue of whether the subcontractor construction trades worker data had been incorporated into the SRS system of records such that we are looking at all of the data in the development of these coworker models. And where this came from was during an interview with [identifying information redacted], he indicated that he believed it had been incorporated into the system, but the question was how do we test this? What can we do in order to identify whether this data had been incorporated into the system of records?

In June of 2016 NIOSH located and captured a fairly large set of job plans for the 773-A Building over an extended period of time, 1981 to 1986.

In August of 2016 the SRS Work Group met and we discussed our plans to evaluate this data. And this work group had concerns that we were only covering one area over a limited time

period and tasked SC&A to expand the scope to include more areas and for a longer duration.

November of 2016 we delivered the first coworker model. This was at Rev 3, OTIB-81. It was delivered to the Advisory Board demonstrating the separate models for construction trades workers and non-construction trades workers could be developed.

At the same time we were conducting a data capture of subcontractor construction trades workers identified on these job plans. This was the test, to evaluate whether their monitoring data made it into the system of records.

December 2016, we had a delay. The site classification review, the site classification officer unexpectedly retired and it delayed receipt of our November data capture until January 2017. This also inhibited SC&A's ability to conduct data captures until we got to February of 2017, which was earlier this year.

SC&A did conduct those data captures in February so that they could do their analysis.

We completed our analysis and issued

the report in June of this year. And that report is Report 83. It's entitled Evaluation of Monitoring in Construction Trades Workers Identified in High-Level Cave Job Plans at the Savannah River Site.

In July of 2017 SC&A delivered their report, The Evaluation of Savannah River Subcontractor Bioassay Data Completeness, to the Advisory Board.

During the August meeting of the Advisory Board both reports were presented in full.

Sorry, I missed one here.

August we had a joint SEC Issues Work Group and SRS Issues -- or SRS Work Group met. And that's where some of these key issues were identified that we'll be discussing hopefully today.

Both of the reports that I mentioned previously were presented in full to the Advisory Board in August, in the August meeting in Santa Fe.

So just to recap quickly. Our job

plan analysis was the analysis of job plans in 773-A from '80 to '86 -- I think it's '81 to '86, sorry.

November of 2016 we conducted the data capture. We found bioassay for 105 of the 110 subcontractor construction trades workers.

Of the 133 contractor CTW job pairings, 88 individual subcontractor construction trades workers required respirator use. And this was our surrogate for whether somebody needed to be on bioassay.

And so here is the table that we presented. The change that I've added to this particular one, and it shows first column there, is the year. The second is subcontractor construction trades workers with respirator use, and then those with bioassay.

And you can see direct monitoring. It's 61 percent, 60 percent, 54, 78, 81, with an average over that time span of 68.2.

One of the things we looked at -- and this wasn't broken out in the report but we talked about it, was on these individual job plans we

looked at other workers who signed in on that job plan. This would be kind of the equivalent of an early RWP at that time. And we looked at, were those coworkers monitored.

And so if you combine the subcontractor with bioassay and if you look at those seven that did not have -- looking at '80, '81 here -- the seven that did not have monitoring, seven of them their coworkers did have monitoring. So either direct or coworker, coworker meaning somebody who signed in on the same job plan so they're doing the same work, at the same time, with the same source term.

And you can see that that direct monitor -- direct and coworker monitoring increases this to 100 percent, 90 percent, 81, 95, 87, with an overall average of 92 percent.

So our job plan analysis evaluated the job plans that required respirator use. 68 percent had direct monitoring, 92 percent had either direct monitoring or a coworker was monitored.

We concluded that the coworker would

be sufficiently accurate. We evaluated for bias and presented that to the Board during the presentation. Considered coworkers on the same job plan, that increased it to 92 percent.

We talked about other considerations, that the use of respiratory is precautionary, and if no incident, there may not have been sampling, you're not going to have 100 percent compliance.

During the work group meeting in August of this year the work groups questioned the combination of DuPont construction trades workers and subcontractor construction trades workers on coworker models due to differences in monitoring and work. And so these are kind of the two to three key issues here.

The work group also questioned whether the DuPont construction trades workers would bias the model, diminishing the true exposure of the subcontractors. In other words, were the subcontractors really a higher population, exposed population than the DuPont construction trades workers. And this is where the 95th percent analysis comes into play where we agreed

that we would do an analysis and break out, from an empirical standpoint because you can't really fit models when you get down to too few data, in order to do the comparison.

And the final key issue that we raised during it was our concerns with SC&A subcontractor reports. And this will be discussed later today. Specifically we have issues with the 30 to 90 day approach for non-tritium samples, and the Notice of Violation.

So let's talk about the first one of the differences of DuPont construction trades workers and subcontractor construction trades workers in a coworker model.

We felt the work was similar based upon interviews with DuPont construction trades workers conducted in May of 2008. This was during our initial worker outreach meetings when the SEC was first filed.

And I want to quote here one of the statements from an E&I mechanic who was with DuPont construction trades workers. He stated that although the site profile accounts for

missed dose he believed we couldn't reconstruct the missed dose for unmonitored workers who were in and out of the hot areas all the time. He explained that E&I mechanics were like construction trades workers named in the proposed class and that they did not work in a specific area like the production workers did.

So this was their words indicating that they felt they were just like the construction trades workers.

During the August meeting we provided seven examples as we talked to DuPont construction trades workers and subcontractor construction trades workers performing similar work at similar locations with similar radiological controls. And what I mean by similar locations, basically the same locations. They're working on the high level drains, the same source terms, same location. And they were doing similar work.

We gave examples of millwrights working on -- millwrights and electricians working on fan motors; pipefitters on the high

level drains; electricians doing conduit, working with contaminated ceilings; pipefitters, sheet metal, and laborers doing manipulator work; pipefitters working on low level drains; sheet metal workers working on off-gas line; and some of the large scale maintenance work that was done.

The second key issue is the 95th percentile analysis for bias. We evaluated the maximum possible 95th percentile of the bioassay of DuPont construction trades workers and subcontractor construction trades workers. The data evaluation consisted of NOCTS data only.

I want to point out that there is significantly more data in the bioassay logbooks. It's available in the SRDB. If the work group feels a more robust analysis is needed, it can be done but it's going to be very time consuming and very laborious to do. So we only looked at the NOCTS data here.

Here's what we have for plutonium at Savannah River. And you'll see that the upper bar here, the upper black bar is the upper 95th

percentile of the distribution. These are box plots, and how to read these is within the box you have the 25th percentile to the 75th percentile the black line in the center is the median.

And you'll notice that for the time period of, let's see, '62 up through early 1984 there's kind of a lower band there. That was the minimum reporting level for the site.

The logbooks actually have data that goes down into that range, but the actual bioassay cards that are on individuals' records will just say less than .1 dpm per day. So that's why that kind of straight line there.

But what we're looking at here is the upper tails here, these 95th percentiles. So that's on the next slide.

And here you can see that the DuPont construction trades workers and the subcontractors in red match fairly well. There's a period in the 1970s where the subcontractors were a little higher. There's a period in the 1960s, 1962 where DuPont construction trades

workers were higher.

Get out to 1986, construction trades workers were higher. But then in 1988 -- I'm sorry, 1986 subcontractors were higher. In 1988 the DuPont construction trades workers were higher. So you're seeing the mix back and forth associated with it.

One of the concerns we had is how few of samples do we have where they're deriving these 95th percentiles. I mean, are subcontractors represented within this group? And here you see the number of workers that are deriving this and, well, there's quite a few subcontractor construction trades workers. In fact, they really increase after 1980, which is commensurate with the site beginning to use more contract workers, even under the DuPont era.

We also looked at the 95th percentile for bias for tritium workers. And here you can see the full box plots with 95th percentiles, and 5th percentile, 25th, 50th, 75, 95th. And when you look at the 95th percentile alone you're looking at, for tritium, you actually do see a

bias here. But the bias is subcontractors are lower than the DuPont construction trades workers for tritium, kind of systematically across the whole time period.

Now, the -- I'm going to say here in a minute that there's a slight bias. And the reason that I say there's a slight bias here, is that difference is really around 50 millirem. This isn't a huge difference between these two groups, even though it's systematic for subcontractor construction trades workers.

Again we looked at the number of monitored -- or number of workers that were used to develop that. And here you can see that DuPont obviously had more workers until you get out to the 1980s. And then that latter tail of that distribution is dominated by the subcontractors.

So we didn't see any systematic difference between DuPont construction trades workers and subcontractor construction trades workers. There's a few years where plutonium bioassay is higher for subcontractors than DuPont construction trades workers but it's not

systematic. The last five years, there's three years where subcontractors were higher and two years where they're lower.

Multiple years where the tritium dose is lower for subcontractors compared to DuPont construction trades. So there's a slight systematic difference. But, again, we're looking around 50 millirems. It's not a big difference.

Therefore, we feel the application of the 95th percentile of the combined construction trades worker coworker model to the unmonitored construction trades worker would be bounding.

And with that I'll be happy to answer any questions.

CHAIRMAN CLAWSON: Does anybody on the phone or in the room have any questions that they'd like to ask Tim?

And thank you for the overview, Tim.

I'm not hearing any. Joe?

MR. FITZGERALD: Yes. Okay, I wanted to take the opportunity to just cover similar ground but in a slightly different perspective. And these handouts are not online, so I'm just

going to go ahead and read probably more literally than I would normally just to make sure that people who are on the phone who don't have this handout understand it.

DR. TAULBEE: Actually, Joe, Stu might be able to get that presentation up there.

MR. HINNEFELD: Where is it? Is it on --

MR. FITZGERALD: It was an email from Ted.

MR. KATZ: Yes, but I think I distributed it to the Board members, so they should have it, the talking points.

MR. FITZGERALD: All right. I'll start. And if perchance you can make it more widely distributed that would make it easier.

SC&A PRESENTATION AND RESPONSE TO KEY ISSUES

MR. FITZGERALD: But in terms of background, it covers some of the same ground. SC&A was tasked in September 2016, as Tim was saying, to conduct a broad-based sampling review of bioassay data completeness at Savannah River for subcontractor construction trades workers.

And as Tim noted, this came out of an interview that we had in 2013 which suggested that there in fact were separately filed copies of subcontractor bioassay records which kind of cued out interest as to, you know, what the status of those records would have been and how complete they were.

And, of course, as Tim also indicated, the ongoing NIOSH review that was completed of one facility, 773-A High Level Cave Facility for 1980 to 1986. And I think at the time, and I think Tim also noted this, a year ago the work group, if not the Board, felt that that may not be sufficiently representative of the completeness of exposure history for the site, given the fact that it was the five or six years and only one facility.

So certainly the Board wanted SC&A to broaden that review, not necessarily given the breadth of what we were looking at, we were looking at decades of experience over all the facilities at Savannah River, not to do perhaps something as comparable in detail but certainly

to come back with an indication in a broader context of the completeness that we'd be looking at.

And one component that we found fairly quickly, not only were there security constraints but also resource constraints at the site in terms of how much scope we would be able to address. And we addressed something on the order of about 300 to 350 workers that were sited on the RWP. So that was almost the extent of what we could possibly do with the resources available.

And I pointed out at the last work group meeting that we relied on available RWPs. And we did some electronic searches and also some physical searches to see what we could find. Surprisingly, at least from my vantage point, we didn't find very many considering the number of years involved.

And the ones we did find I would characterize as running the gamut of different formats as well as different scopes, and anywhere from a standing RWP to RWPs that were very

explicit about the end-of-job bioassay. Others that were actually very vague about the, you know, the nuclides involved.

We decided to go ahead and try to work through what RWPs we had even though in my view it was an incomplete set, and try to make the best of what we could in terms of coming back with an indication of completeness.

MR. HINNEFELD: Excuse me, Joe. Are you speaking from the presentation you sent?

MR. FITZGERALD: Yes.

MR. HINNEFELD: The talking points for Tuesday?

MR. FITZGERALD: Yes.

MR. HINNEFELD: Because I think I'm showing that on Skype now.

MR. FITZGERALD: Yes. This is entitled, these slides entitled Summary of SNA's Concerns.

MR. HINNEFELD: Yes, okay. That's the presentation I have up.

And are you on the background slides?

MR. FITZGERALD: I'm on the background

slides, exactly.

MR. HINNEFELD: Okay. All right.

MR. FITZGERALD: And I'm assuming everybody can hear me through this mic.

But anyway, so that was in my view a real impediment. You know, you'd like to think you had a relatively representative set of RWP documents for the time periods involved. We did not. And to me it was indeterminate what slice of what was out there we did have because, you know, certainly 11, 12, 13 wasn't the extent over 20 years. However, there was no way of knowing what was the full scope.

We never did establish, even though we did have some inquiries with the site, what the -- where the other, certainly the majority of the RWP documents and construction job plans might sit. But, you know, again they might be in other files. Some of them may have been destroyed. Some of them may be sitting with legal counsel, understanding that there was some, you know, regulatory concerns that were expressed later in the '90s.

So, you know, pick any of the above. Certainly we didn't see very many of them.

We found varying levels of bioassay completeness as a function of what the RWPs were counting. And we said 16 to 34 percent. We could have certainly used different criteria and came up with anything from 10 to 50 percent. I mean, it was one of these where once you accept the fact that you have only a portion of the RWPs available and the RWPs themselves varied that much in specificity, we were dealing with a fairly biased sample to begin with.

But, anyway, given the charge to come up with an index, some indications of completeness, we did so.

In any case, this gets me to my final point that, frankly, there's been a lot made of the NOV that we happened to identify towards the end of our review. And it really was at the very end of our review. It wasn't even a revelation that came from the site visit, it was sent, frankly, on the NTS, the Noncompliance Tracking System that I, frankly, spotted that as I was

putting the report together and felt that it was relevant enough to go ahead and identify and bring forward.

We didn't do any further follow-up or review. I think that Tim's group did that after the fact. But we just wanted to make sure that was factored in.

Certainly from our standpoint we felt that was, given the qualifications of our on-site review, we felt the Westinghouse self-surveys that occurred in '97 actually were perhaps the only credible sampling review or reviews of samplings that were done. Because it was a contemporary review. It was -- they certainly had access to the RWPs, all of them that represented the job-specific bioassays. And they certainly had the motivation to get to ground truth as far as where things stood.

And we've covered this ground in the past, but in 1997 early on they did a limited survey to see where they stood. They came up with 67 percent incompleteness as far as the participation of workers in job-specific

bioassays required by RWPs.

They went back and did a full survey in September of '97 for the second quarter of '97 and came up with 79 percent incomplete. So this was 79 percent of the job-specific bioassays required by RWPs at Savannah River were incomplete.

And they were incomplete because the, again the administrative controls that would have provided for workers to provide bioassays were such that a lot of the workers were -- did not leave bioassays and, again, there was not a system to compel that or to catch that and bring them to the fore. So that was the circumstance in '97.

I'm going to go to the next slide. Hopefully you can see this.

But I wanted to provide more context. You know, we've talked about the '90s and what was happening. And I've touched on this in the past. But I think there are real reasons, you know, you wouldn't expect to have, you know, fundamental bioassay issues, questions of RWPs.

And these are sort of basic parts of the program. And I know a lot of us didn't give the 1990s a lot of attention just simply because from experience perspective it would be kind of surprising to find any, you know, fundamental program issues during that time frame.

But at Savannah River in particular, if not maybe more broadly in DOE, there were fundamental program changes that were occurring that I think were stress points for these sites. And for Savannah River this was occurring pretty much 1989 and into the '90s.

In 1989 Westinghouse Savannah River Company assumes the operating contract from DuPont. And with the advent of the Westinghouse operating contract, certainly the objective is to instill more formality of operations, to bring commercial nuclear standards into -- to look at more procedure-based versus expert-based.

And this is all things that were occurring across DOE. This was not exclusive to Savannah River. But certainly with the advent of that contract in '89 these were actions that were

going on.

At the same time, because of K Reactor restart activities, broadening D&D, and environmental cleanup you had, you know, much more extensive outsourcing of radiological work and an increasing influx of transient subcontractor CTWs.

And I think Tim points this out in his, in his plots where you can actually see the increasing numbers of subcontractors at the site. So these were all things that were happening certainly in the early '90s.

And, again, the fundamental changes in the SRS mission where you went from a pretty stable environment during DuPont years, where you had production reactors producing tritium, you had processing in the Canyons. All these were pretty routine operations, stable operations, pretty much a core workforce.

All of a sudden you're talking in the '90s you're getting to a much more extensive operation with D&D cleanup, trying to get K Reactor up. So you're introducing not only a lot

of new workers coming in, in terms of outsourcing but new and different source terms. And you're talking about much more activities involving waste management, more activities involving D&D cleanup. And all this involves much more of an unorthodox mix of source terms, radiological hazards, and situations where you have a lot of job-specific issues revolving around unfamiliar sources.

And not to mention you're going to have a situation where because of the nature of the changing work you're going to have a much more extensive use of RWPs, radiation work permits. And particularly when you're dealing with transient workers, dealing with jobs, specific jobs, or jobs that really require special approaches where you have specific source terms that aren't typical of the normal work at the site.

And more independent outside audits and reviews, I think that's pretty clear.

And finally, you have 10 CFR 835 with Price-Anderson enforcement beginning in the '95-

'96 time frame. And this brought with it its own scrutiny about procedural compliance.

So the take-away is that you had considerable change. This is not to say that Savannah River didn't have a sound dosimetry program. It did, internal dosimetry program. But the administrative part of it, the administrative system, the procedures, the practices that served as the framework under which this program was implemented I think it's fair to say based on the reviews that that lagged to some extent with these changes. And this caused some of the issues that I think were realized in the NOV and some of the activities that we looked at in terms of self-assessment.

And these have implications for dose reconstruction. I just want to set the stage for that that, you know, it's not so much the health physics, the dosimetry so much, but the implementation of the program, the administrative systems, the procedures and processes which because of these kind of stresses and changes you're talking about lagged in terms of those

changes, and that caused some of the issues I think we're talking about.

Okay. I want to turn to the actual Notice of Violation.

And, you know, during the last Work Group meeting I think the comment was made that the NOV, as I think we're calling it, was characterized as a distraction to this question of completeness. Now, I think I'd have to push back on that a little bit. It's not, okay.

I think it was a, certainly from the Westinghouse standpoint was a, was a bit of milestone in terms of bioassay implementation at Savannah River. And more broadly speaking it was a pretty significant issue across DOE such that, you know, the DOE headquarters' enforcement program in early '99 took a rather unprecedented step of having a 120-day enforcement stand-down to permit each DOE site to self-assess its bioassay program in terms of the implementation of those internal dose evaluation programs against what they found to be 31 general deficiencies that they were picking up in their

reviews across DOE.

So, again, the notion is that even at that late date from an enforcement standpoint, 10 CFR 835, there was a real concern over whether the DOE sites were effectively implementing their bioassay programs.

And I would like to add that getting to the NOV, Savannah River was cited under 10 CFR 830 for procedural noncompliance taking it as a whole, the correction actions from the NOV and the related self-assessments. Again, because of the stand-down there were self-assessments that Westinghouse did on the site to look at its own programs. And there was a number of major upgrades.

I mean, they looked at the RWPs which, you know, we looked at as well and found them wanting. Well, they took a hard look at their RWPs and also found them to be inconsistent and not specific to the nuclides that should be listed and they came up with a standard format.

In 1999 they looked at the lack of effective bioassay tracking and accountability

and came up with pretty much a wholesale revamping of how that system worked, that clearly it wasn't working from an administrative standpoint and there wasn't much accountability in terms of requiring the workers to in fact participate.

Again there was inadequate experience-based source term categorization, and that was replaced by a more analytic approach. I'm going to get into this a little later but I think this is a significant issue that -- at Savannah River where you had a basically an experience-based system where the line management or the RCO, the radiological control organization, specifying the source terms that would be the facility source terms for bioassay that would wind up in the RWPs.

However, as things changed at the site, whether new source terms were introduced at certain facilities, whether you had D&D perhaps, or maybe a more complicated situation with waste management, the specification of what nuclides, you know, what workers, you know, what would be

the enrollment nuclides for workers, wasn't keeping pace with that. In fact for source terms like americium for some of the facilities, that wasn't winding up in RWPs and, therefore, workers were not being necessarily bio-assayed for these sources.

And you have an RQ, I think it's RQB, Radiological Qualification Badge, I think that's what it is, which is sort of the passport for the worker in terms of what bioassays would be required of that worker. And the procedures at Savannah River in fact linked that RQB, which again is this sort of specific radiological passport, to the job-specific bioassay program where you basically had the job-specific bioassays in terms of the RWP identifying the routine source terms as opposed to actually requiring an analysis or characterizations of the actual job in terms of what the nuclides of importance might be. And there was a disconnect.

And a lot of this comes from, again, what I was saying earlier, you had a very changing environment. Where when you had a stable

environment where everybody, including line managers, knew what the source terms were -- this is a Pu facility, this is a tritium facility, therefore in the RQB and the requirements should be, you know, tritium or Pu or whatever, you had a changing environment where you were beginning to interview source terms or having people move around from site to site, facility to facility.

And instead of the RQB being flexible enough where you would have somebody add source terms as you moved around the site, it became clear that, no, actually the RQB was the, you know, was based on that home facility for the worker. And, therefore, if there were other source terms that might have come along by maybe that person being assigned to 773-A or that person being assigned to waste management, those source terms weren't being added and the bioassays on job-specifics weren't happening.

So we had those kinds of disconnects which were kind of administrative disconnects. But nonetheless, for this program in terms of dose reconstruction as you can imagine it has

some real implications as far as whether or not there was unmonitored exposure.

The other item I want to mention is, you know, we talked about, well, if, you know, somebody was on job-specific bioassay for a long-lived actinide and, okay, the job-specific bioassay was missed, not a big deal. You could catch that later, you know, in a later bioassay. That would have been the case I think in the stable environment of the '80s under DuPont.

But as you increase the numbers of transient subcontractors that you are dealing with on site the dynamic changes. Then you have a lot of workers that are in and out. And if you're talking about a missed job-specific bioassay for a long-lived, say, actinide, there isn't that surety you're going to catch them in the next cycle. This worker may be gone.

And the termination bioassay program at the site wasn't necessarily designed for this transiency. It was a sort of a traditional, if they leave it, fine. If they don't, you know, that's not going to be an issue. And that

accountability was not built in until 1999 in the throes of the self-assessment that DOE enforcement required each site to look at.

And I think Savannah River at that point realized, yes, they needed a more accountable system that wouldn't let somebody leave without at least leaving a bioassay.

So, just again on the NOV, we've had some exchanges on this. But I'd like to indicate that I think it did -- was significant, I think it did demonstrate shortcomings in the bioassay program that has implications for dose reconstruction looking backwards saying, okay, if that's the situation, these are the corrections. What are the implications for the earlier years?

Okay, I'm going to turn to the next one. And this is a slide just, you know, kind of similar to the way Tim has framed this. On the job-specific bioassays non-participation, which is kind of what we've been talking about as far as the NOV and the completeness issues.

I'm not going to cover this in detail because we talked about this before. But what we

know is that DOE Savannah River identified this concern for the first time in December '95. This was the exit meeting following what was apparently a field office review of the question of completeness or participation in the job-specific bioassay program.

Now, I've seen some indications, and I have not been able to find -- maybe Tim might have some other perspectives -- but some mention was made of a 1996 indication of a survey of some sort, but I have not seen that. This was something that was referenced by DOE in both its correspondence as well as some of the enforcement meeting notes. But I have not seen anything for '96.

The only thing that I've seen are self-surveys by Westinghouse in May of '97 and September of '97. And also a new sampling that was done by Westinghouse after the results of the September '97 survey was available. And I might add that that survey showed no internal dose was needed to be assigned, no intakes.

And I did not see any further re-

samplings. I think there was an indication that resampling had been considered for 1996 but not done because it wasn't deemed as being cost-effective. No intakes would have been expected so it wasn't deemed cost-effective to do.

What we do not know -- that's what we know -- what we do not know in my view is how far back in time non-participation goes for job-specific bioassays. DOE in its enforcement process found the issue to be repetitive and not responsive to past corrective actions. So I think my concern is that this is not just about 1997, okay, even though that's where these surveys took place, or even about '96. But I think it has implications going backward in time for the 1990s, and perhaps earlier. Certainly that's the indication.

For missed job-specific bioassays what actual intakes occurred due to, quote, unrecognized field conditions or other types of personal error, and this is the wording that we see in Westinghouse's response in NOV, may not necessarily be discovered in subsequent bioassays

for the reasons I mentioned before, because of the termination bioassay program inadequacies.

My bottom line on this is that, those incomplete -- and I think this is where we're at quite frankly -- those incomplete job-specific bioassay records equate to missing data to support coworker models. Sort of comes to the same place that Tim came to, and I think that's kind of where we're at.

And perhaps this is where there's a bit of a fork in the road which I think is kind of what we're trying to talk about today.

I'm not going to go over this slide because I think we're going to cover this in more detail. Ron has spent some time looking at the, at the report that Tim's team put together on 773-A, the caves facility. And we have some concerns over some of the considerations. But, again, I'm going to wait and let Ron get into that.

But it really gets down to questions of whether in fact we're in a comfortable place relative to bias and representativeness more than

anything else. And I think that's where we have some issues.

Next one, please.

So, from our standpoint, you know, and this question has also -- and I recall a number of folks raising this issue early on, even last year at the Board meeting when we sort of got into this, is how complete is complete? And realizing we've been all over the map. I mean, you know, anywhere from 70 percent is okay. We can deal with 60 percent. We can mitigate that and bring it up to, I think, Tim, you were saying 90 percent.

You know, it strikes me that the absolute value of the percentage is becoming less important because, again, you can come up with whatever number you want. I mean, I think Westinghouse came up with 67 to 79 percent incomplete. But, you know, again the question of how complete is complete.

I'd like to go back to something we spent a lot of time on which is the draft criteria, the coworker guidelines that I think

Jim spent quite a bit of time in 2015. You know, I remember the discussions and it wasn't an easy process.

But I think the notion was that instead of having sort of this very subjective and, you know, a bit of hand waving approach to coworker model, the basis for coworker model development that maybe it would be useful to have some criteria that would guide the Board and NIOSH in terms of whether or not one had the appropriate ingredients, the basis, the justification for coworker models.

And so, you know, looking at this issue and realizing that, you know, we -- at reasonable interpretations of what complete is complete. I think what would be useful is to go back to those criteria and just walk through it. I mean, that was the whole intent was to have some basis for making judgments. And I think that still has some merit for, for our discussions.

The other thing is -- and I only bring this up because I think SC&A just submitted

comments in on the OTIB-75 Rev 1 revision. So I asked Ted to go ahead and -- I don't know if that got up on the website or not -- but I thought some of the comments there on the stratification issue would be useful to also touch upon, recognizing that just came out last month. But actually the original review which really I don't think has, we haven't changed our position much, was 2010. So that was seven years ago.

So, actually in some respects it's not a new issue at all but one that we had concerns with back then. And I saw some of the comments on stratification that were listed in Tim's presentation. So I think that's also a touch point that we'd like to do. So those two touch points I think would be very helpful just to clarify where things stand.

And I'm going to walk through how we read the draft criteria. And with the author across from me it's particularly daunting. So I'm just going to walk through it and with my own humble interpretation just say, you know, from the standpoint of Savannah River where we think

we are. And, clearly, this will be fertile ground for some discussion. But I think this would be a useful framework, frankly, of just seeing how things might pan out.

In terms of the draft criteria I'm just looking at the completeness piece of this, not all of the criteria but the notion of completeness. I think what was in the guidelines, and I'm quoting, these are direct quotes, the amount of available monitoring data must be evaluated to determine if there are sufficient measurements to ensure that the data are either bounding or representative of the exposure potential for each job or exposure category at the facility. Okay.

Secondly, if in fact it can be established that the categories of workers were potentially exposed, yet inadequately monitored, it could preclude development of a sufficiently accurate coworker model unless it can be established that the exposures to another adequately monitored category of workers reliably bounds the initial category's exposure.

And from our standpoint we feel, and maybe I'm wrong about this, but it can be agreed that SRS workers under RWP prescribed job-specific bioassays were in fact potentially exposed, not likely but potentially exposed but not adequately monitored, i.e., because of the non-participation they did not receive, a number of them did not receive bioassays.

The issue turns from the question of completeness to one of what category of monitored workers can their missing exposures be bounded with. And that's where we go to the question of an alternate category of workers.

And from our standpoint the alternate category of workers -- and this is something I think in Tim's presentation he identifies some of that -- for those under RWP who provide job-specific bioassays would be presumably the Savannah River workers with routine sampling, routine bioassays. That's where you have considerable data for comparison standpoints.

However, again I'll go back to the guidelines, require that coworker data sets

should be established from monitored workers with comparable activities and relationships to the radiation environment. Okay.

And looking at that, that to me is a bit of a bellwether because this question of representativeness I think is where this, where we may again differ from where NIOSH is coming out.

And the criteria that guides that is one where to accomplish this, to accomplish this notion of representativeness, the coworker data set should be established from workers with comparable activities. It's required that each coworker data set be, quote, either representative of the distribution of exposures for the intended population or that provides a plausible upper bound for those workers.

Now, in terms of representativeness and use of routine sampling data, I think it's, you know, it's useful to go to where Westinghouse came out. Because I think they looked at this issue and realized in the early '99 time frame that they had a problem in terms of how their

RWPs were prescribing bioassays. That in fact they were linking the job-specific bioassay program in terms of identifying source terms with the routine program.

And they were purposely trying to unlink that because, again, it was leading to line managers relying on RQBs, these Radiological Qualification Badges, which serve these very set sources being the, you know, the Pu facility, the Pu bioassays, quite apart from whether or not any other activities were introduced or whether there's D&D going on in the corner and people are getting -- you know, RWP-driven bioassays over here in the corner they were just getting Pu bioassays, even if it might have been americium in the corner.

So, anyway, the Westinghouse statements on the subject of this whole question of RWP work and job-specific bioassays emphasized a key distinction that you can't do that. RWP job tasks may involve, and this is a quote, non-routine mixes or concentrations of rad materials which differ from routine work in typical work

environments.

Okay, monitoring for the latter may not be appropriate for the former. Okay. And there's a couple of references on that.

And the notion is that the work activities in terms of routine, the routine sampling program workers in typical work environments are neither necessarily comparable nor relatable in terms of the radiation environment. You can't assume that these workers that are working over here doing D&D, doing cleanup, doing some specialized activity over here in a waste management operation where you have a whole, you know, a whole spectrum of source terms, that you can apply the routine sampling program for CTWs that are in a stable work environment to them.

And, unfortunately, the system that was in place, the administrative system was leading to situations where the -- there wasn't a characterization of that specific work, and that wasn't lining up on the RWPs. So you had a real disconnect there.

So, in general the question that the guidelines pose, you know, can you in fact find an alternate category of workers for which you can apply their bioassays in a coworker model, I would say for these workers working under RWPs in these specific work environments you cannot.

There's two circumstances that workers at Savannah River were under these RWPs. The workers who were not on the routine program, as you can imagine, if you brought in a subcontractor and you wanted him to do a specific job and then that subcontractor would leave, you wouldn't put them on a routine program, you'd probably put them on job-specific. However, they might be working on something that, frankly, wasn't too exotic. So that might actually be comparable.

However, you might take a worker who was on site doing standard work and have that CTW go over and do some specific cleanup over here, and they would be on a job-specific bioassay, but it's not clear that they in fact would be being bio-assayed for the work that they're working on.

They might be more likely being bio-assayed for the RQP -- RQB required bioassay for the base facility they're from.

So, there's some real questions about those source terms.

The other thing, and this gets to OTIB-75, and OTIB-75 is the Use of Claimant Datasets for Coworker Modeling, this gets down to the question of the representativeness of the stratification itself, that the representativeness of the claimant population for tritium for one thing, but also the stratification of CTWs' versus non-CTWs' results for actinides and activation products. And the stratification over time and work areas for both groups.

And I think our -- Ron is going to get into it. He was one of the co-authors of that review. But I think there's real questions about taking NOCTS data in terms of making assumptions about different job categories and applying that without the kind of testing of the stratification that we're not fully aware of. And, again, I

think Tim presented some perspective on that. But I think what Ron's going to do is get into some of the concerns that we have on that. I think that's a question as well.

But that to me is a parallel question. It's not fundamental to this question of using routine sampling data for job-specific bioassays.

And actually, Ron, I set the stage. You actually have the next slide which I think is sort of a thumbnail sketch of those comments if you want to get into that now.

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

I have to give a little bit of background before I can come to that slide that Phil has on the screen.

OTIB-75 was originally released in 2009. And what it consisted of was that they looked to see if the claimant database represented the overall population. And so they looked at three sites: Y-12, they had a complete data set for the uranium; Mound had plutonium; and Savannah River Site they had a tritium data

set in the '90s.

And they compared the claimant data to the complete data set to determine if they were representative. And this was released in 2009 by NIOSH.

And then in 2010, January of 2010, SC&A released their evaluation of this. Now, I did not author that review, Hans Behling did that. But I have reviewed the recent release. NIOSH released a revision of OTIB-75 in 2016. And we reviewed that and released that in October of 2017.

And what we found was originally that the data did indicate that the claimant data information was sufficiently aligned with the complete data set for uranium at Y-12.

At that time we did not find that the plutonium aligned for Mound, however, the data was fairly sparse. And later that more data was acquired. And I'll address that in a minute.

And then the Savannah River Site had a limited, just a tritium database for the '90s.

And so our original findings, what

SC&A did was they looked at those comparisons, and they said that Mound did not seem to align. Now, NIOSH did come out with a revision in 2016 which added some more data points. And we re-analyzed Mound data and we found a statistical error, the plutonium data for Mound did align the claimant data with the total population database.

Now, in our original review in 2010 we did put the qualification on Savannah River Site in that the tritium was just for that period of time, it was only for tritium and it was only for that location and that period. You couldn't extrapolate that to other times necessarily without further evidence.

Now, the team at that time, led by Hans, looked further at the claimant database and they looked at stratification to see if you could say that you could take this information and apply it to the general public, or the general working population I mean.

And so they looked at Savannah River Site. This was when the Savannah River Site SEC originally was being discussed. And so Hans

looked at the claimant database and looked at stratification, or looked for stratification. And he looked at the construction workers and non-construction workers, and looked at job scenarios within those construction and non-construction and then compared them. And that report was issued in 2010 and had several findings.

And he did find that there was stratification in the intakes for the different workers, different areas, construction versus non-construction that should be addressed before you say that the coworker data could be applied across the board to the claimants.

And so we recently did a reevaluation of that. We did not find that the additional data points addressed stratification, they just increased the strength of the statistical analysis comparing the claimant data to the overall database. And like I say, we did say that finding two, which was for Mound's program, there were additional data points that did indicate they agreed.

However, we don't find that the stratification of using the coworker model for the data at Savannah River Site has been completely addressed as far as stratification goes. And so we issued that report in October 9th of this year.

So that's our current position on that OTIB-75.

And I'll read the slide. This was the original finding, and we find it applies today, that Joe has made. SC&A's evaluation of OTIB-75 for Region I, use of claimant data sets for coworker modeling. SC&A evaluation of SRS NOCTS data which was compiled by NIOSH as the basis for a coworker model to demonstrate the ability to reconstruct dose with sufficient accuracy is as follows. And this is taken from page 55 of our original report in 2010.

Conclusion number one is the conclusion that the claimant data from the 1990s for tritium are representative of the claimant population can, at best, be applied to that radionuclide and that period. This conclusion

cannot be back-extrapolated to other periods. Even in this period there were differences between construction workers by year -- and we actually went by 10-year decades -- craft and non-construction workers.

There are considerable differences in exposure between job types and areas, even when the data is done by the decade period. This applies to all non-construction as well as construction workers when compared to other groups -- others in the same group. The data indicate that construction workers in some areas and periods had greater exposure than non-construction workers.

SC&A's overall conclusion for Savannah River Site coworker model development is that the NOCTS claimant database may be inadequate for the purpose of -- for SRS construction workers. And we feel that a more complete analysis of this as far as stratification for construction and non-construction workers' titles, jobs, time and area is warranted.

And so at this point they did analyze plutonium, uranium, enriched uranium and mixed fission products as well as tritium in their analysis.

MR. HINNEFELD: Can I just ask a question about the OTIB-75 review?

OTIB-75, it is my understanding, was intended to determine whether the claimant population monitoring data was essentially similar statistically to the entire monitored population. Is that correct?

DR. BUCHANAN: That's, yes, that's what NIOSH set out to do in that OTIB.

MR. HINNEFELD: So it didn't attempt to say are the construction worker claimants' data is that representative of the total construction workers? Is that what you're talking about by the -- it didn't really look at the stratification?

DR. BUCHANAN: Correct. It did not -- OTIB-75 did not address the stratification. And when we reviewed it, at this point we said, okay, we agree with your statistics on the three sites.

However, we looked in more detail at the claimant data. And within the claimant data there's stratification. So you really couldn't just take the blank claimant data and apply it to the population without looking at stratification.

DR. NETON: But that -- well, go ahead.

MR. HINNEFELD: But this -- so the question of stratification then is different from, is the claimant data representative of the total data?

DR. BUCHANAN: Correct. Yes. In part, yes, other than you can't say our claimant data represents the total data if you don't look at the stratification and say -- if you've got stratification in the claimant data you can't just blindly apply the average to the overall population.

DR. NETON: But that wasn't the intent of 75.

DR. BUCHANAN: No, that's correct. We --

DR. NETON: That was our initial comment on the findings that were issued was that

it was never intended to be a stratification model. It was, like Stu said, a proof of principle that the database, NOCTS database was statistically equivalent on a random sampling basis to the overall population.

MR. HINNEFELD: I think, yes, we may be talking past each other here. Because I don't really think it matters to your point.

Your point is that the data is stratified and you can't use one data -- essentially if the data is stratified and claimant -- construction claimants are different than anybody else, so there's a stratification in the claimant database. What that would say is that you cannot use a general all worker model.

DR. BUCHANAN: Correct.

MR. HINNEFELD: Okay.

DR. NETON: But that's really not a finding of 75. That's my point.

MR. HINNEFELD: Yes, I understand.

DR. NETON: It has nothing to do with OTIB-75.

MR. HINNEFELD: But we're talking past

each other here because that, the point they're making I believe, they believe is relevant to Savannah River rather than just the general use of OTIB-75 that it's, you know, saying that claimant population is an okay -- what 75 is trying to show is that if you don't have an electronic database for all of the data from the site so, you know, you don't have an electronic database, the claimant data, claimants are sufficiently representative of the total population in terms of exposure, that the claimant data can be used as a surrogate for the total population of the coworkers.

It didn't intend to speak to the stratification at all.

DR. BUCHANAN: Exactly.

MR. HINNEFELD: And so there's -- you know, whether it's a finding of, you know, 75 or not, the point you're making is relative to Savannah River.

DR. BUCHANAN: Right.

MR. HINNEFELD: But not necessarily to the question of whether claimant data is

representative of --

MR. FITZGERALD: I think maybe the best way to understand it is when the comment was made was sort of a however, you know --

DR. BUCHANAN: With a big asterisk.

DR. NETON: Yes, I understand that. But I think the relevant comment is against maybe OTIB-81 because we've already done the stratification issue, we've done coworker models, you guys have reviewed it. And I think that's where we should focus the efforts, not on 75. Because 81 went and stratified a priori. And we did stratification for three different classes of radionuclides. And you commented on it. And none of these issue have come up in a review of 81, and those are stratified coworker models.

MR. HINNEFELD: I didn't really mean to --

DR. NETON: Yes, I'm just saying.

MR. HINNEFELD: -- taint the discussion here. I just felt like 75 had a specific purpose.

DR. BUCHANAN: And I was going to bring that up.

MR. HINNEFELD: And so to my mind the fact that it didn't address stratification is because it wasn't intended to address stratification, it was intended to say, you know, in general do claimants look like the total population. And that's essentially what it did.

MR. FITZGERALD: Yes, and I think we can accept that 81 would be the proper focal point for this issue.

MR. HINNEFELD: Right.

MR. FITZGERALD: It was identified but this is the right vehicle.

DR. NETON: It was only identified in Savannah River, that was one of the test cases that we used to do proof of principle. We did Mound, Y-12, and Savannah River. And we said, look, based on these three sites it appears that we have random sampling for the site. And we attempted to say that provides a general framework that could be applied to complex one.

MR. HINNEFELD: Right.

DR. NETON: That's all we were trying to say.

MR. FITZGERALD: Okay. So I think we can bring this back to 81 if there's any issue that we need to surface.

DR. NETON: Agreed.

MR. FITZGERALD: But this was something that was fairly recent and didn't touch Savannah River, and there were some residual concerns that, again, we wanted to mention.

MR. HINNEFELD: Okay.

DR. TAULBEE: If you go back to that 2010 report which is where some of these conclusions come from, I'd like to point out that that was the reason we did all of those studies that I pointed out in the beginning of the chronology of comparing construction trades and non-construction trades, was that this stratification issue was raised under the guise of 75. And so that was the whole reason we issued all those reports.

And when the Work Group, the SEC Issues Work Group met about it, there were discussions of power, can you actually see this. All of that work was done before the time-

weighted OPOS. And so those comments from back in 2010, while are still lingering, they should be addressed, as Jim was pointing out, under 81, not under 75.

MR. FITZGERALD: Yes, we can accept that. Okay. And, again, it was just the currency of that having just been submitted a few weeks ago, I just wanted to make sure we didn't lose that, that item.

DR. TAULBEE: Understand.

MR. FITZGERALD: Okay, can you slide that back? Thank you for the clarification. I think we can deal with that.

I want to pick up again on the co-worker guidelines. And, again, what we were saying earlier before Ron spoke is SC&A finds the RWP-required job tasks at Savannah River with potential exposures monitored by job-specific bioassays may not be comparable to typical job activities and routine monitoring.

And, you know, this has been part of the back and forth we've had on the question of applying the data that we have, which is the

routine sampling data, as well as traditional data that could be complemented.

If the data set for routine monitored exposure is not representative of RWP jobs and can be applied -- cannot be applied, again, a remaining option is to apply a plausible upper bound dose for those workers.

But, again, I think we run afoul of the question of whether it's a representative population. And given the, you know, the fact that we lack a large proportion of the job-specific bioassays --

MR. KATZ: Can you hold one sec, Joe?

Excuse me on the line, somebody now has opened up a line that has a lot of background noise. So, if you're new to the call can you put your line on mute so that you're not disturbing? Otherwise other people on the line are not going to be able to hear the discussion. And to put your line on mute if you don't have a mute button, press *66. *6 I mean.

MR. HINNEFELD: *6.

MR. KATZ: That will mute your line.

Thank you.

MR. FITZGERALD: Okay. Let me just repeat that one bullet that we have here.

However, while a representative population are lacking a large proportion of the job-specific bioassays upon which a valid dose distribution could be derived and compared, again I think in terms of applying a, you know, whether it's a 95th percentile, 99th percentile, an upper bound dose, you know, the question is, is there any mitigating circumstances in terms of additional data?

And I know back in August we were hoping there would be more resampling data. I think, am I right, Tim, all we have is the '97 data as far as resampling data? I haven't seen any evidence there's additional resampling or sampling of these job-specific bioassays --

DR. TAULBEE: No.

MR. FITZGERALD: -- job-specific bioassays.

DR. TAULBEE: Only for '96 and '97. '96 they just did an evaluation and said they

didn't feel like anybody had --

MR. FITZGERALD: They did a sort of offline review saying it wasn't worth it because they didn't think there were any intakes. So really it's just the '97 survey data.

And in terms of intakes found by subsequent bioassays, you know, there were some exceptions that were identified. And I think in both the cases that we looked at they were picked up in subsequent bioassays. But I think our concern is the question of the transient subcontractors, and whether that would have been the case for that group.

Okay, other concerns. Almost done.

We didn't get a chance to pursue this in any great detail, but in terms of the documentation that came back in this last data capture a couple things piqued our interest, one of which was the apparent lack of tritium bioassay tracking prior to 1996. The Westinghouse Facility Evaluation Board, the FEB, reviewed and reported back in '94 and '95 citing deficiencies in the SRS tracking of tritium

bioassays.

It prompted Westinghouse to implement a tritium bioassay tracking delinquency program in May of '96. The program manager at the time said, and this is a quote, prior to this there was no tracking program for the tritium bioassay program.

You know, I actually posed that question to a dosimetry manager at the site. And I think the concern, the response was he felt maybe no centralized program versus tracking.

I don't know, it just concerned me that there would be an admission there was no tracking of tritium bioassays, particularly given the amount of tritium sources. That left sort of a lingering question in my mind. Even though tritium is very forgiving, I'll be the first to admit that, however it was still a surprise.

So, I just listed that as a revelation of sorts that there was no tracking before '96, particularly given my recollection of Mound and other sites where it actually was pretty well tracked and accounted for.

So I, again, I'm a little concerned about that.

And of course this question of workers enrolled in incorrect routine bioassay programs prior to '99 and, again, from documentation there were unrecognized americium sources. And in terms of RWP preparation workers at some SRS facilities unmonitored for americium, even though it was a source term at the facility.

And this, again, I mentioned it earlier, site-wide formal radiological hazard characterization process was in fact established in March of '99, which was a full analytic process where facility by facility Savannah River came up with a systematic way of identifying what the important source terms, it had to be 10 percent of the -- I believe 10 percent of the internal dose contribution for a particular nuclide to wind up on the RWP.

So that was all done, but that was done in '99. So that certainly is a concern there.

We also looked at, you know, the

database, bioassay database to see if there's any other instances. You know, DOE cited one instance where a bioassay wasn't collected and somebody ended up with a fairly hefty internal uptake. And we looked as well, and we found a circumstance where a CTW was not enrolled in a routine plutonium bioassay program due to the primary work area.

And there is a case where the RQB had the worker, you know, enrolled in a certain bioassay program. Apparently the worker, CTW, this was in the '80s, he was a DuPont one of these CTWs that moved around the site, apparently picked up an intake and had an uptake of plutonium in some activity somewhere on site. It never was determined. But in a subsequent bioassay they picked up a -- the uptake.

And, again, I think this sort of amplifies the comment earlier that as far as source terms go it's not clear that the RQB system, the actual RWP identification of sources, was keeping up with the changes at the site.

Finally, the sort of compilation of

pretty much what we've covered. In general I think what concerns we have are that certainly within this Work Group discussion I'd like to address today is, one, workers who performed work at Savannah River under RWP required job-specific bioassays have substantially incomplete monitoring data.

Intakes may have occurred and may have been missed for transient subcontractors.

Secondly, RWP jobs often differed by source terms and potential exposure from routine work. And, again, I think Savannah River was very adamant about this in '99, routine monitoring data should not be used as a surrogate for missing RWP monitoring data.

Thirdly, based on NIOSH comparisons of maximum possible 95th percentile dose distribution of Savannah River Pu bioassays for DuPont CTWs and subcontractor CTWs -- and this is coming from some of the analysis that Tim talked about earlier -- yes, I mean, I think there are results. And this is where it gets a little ambiguous where you did have subcontractor Pu

bioassays coming up higher, two to five times higher I think was the number that we heard in August, than DuPont CTWs.

And, yes, I think I understand the perspective that that works both ways. And tritium, you know, swung the other way as well. But sort of coupled with the interviews that we've had in terms of subs being brought in to take on the dirty jobs, the hotter jobs on occasion, it certainly raises the question about whether in fact these are two distinct and different cohorts in terms of exposure potential.

Certainly another item is the question of how complete is complete enough for coworker development? And, again, I think, as we indicated, we need to walk through the coworker guidelines and the stratification assumptions to make sure that, you know, that they're valid from those standpoints. And make sure that the data sets can be legitimately applied.

But, you know, sometimes I think we have to step back because, you know, I think we've had discussions in the past. I remember

struggling, I forget, maybe it was Mound or one of the other sites where we were trying to address 5 to 10 percent incompleteness. We spent a great deal of time trying to figure out that was all right.

We're starting at least for these workers that were under these RWPs with upwards of 80 percent incompleteness, so I don't want to lose that perspective that, you know, this is a significant issue of completeness that I think the Work Group needs to focus on. And we need to reconcile, frankly, the question of does that equate to being unable to support a coworker model?

And, again, I think the question of source terms is very clear that at some SRS facilities workers went unmonitored for americium due to inadequate source term categorization and other radionuclides very likely would have been missed because of the system that was in place that was focused on basically the line manager making the calls and the assumptions that you had a stable work environment with stable source

terms going into the '90s when in fact that was changing rapidly.

And the time frame of the monitoring gap is unclear before '97, as is the worker cohort. You know, we've talked CTWs versus non-CTWs, subcontractors versus CTWs. But in terms of the missing data, it's essentially workers that were under the RWP-prescribed job-specific bioassays that in fact had missing data.

And I think Stu raised this question last time, you know, who in fact are these workers? You know, and I think you end up having a mix, probably a lot of subs but certainly some CTWs on the site and there may be in fact workers that were on routine bioassay that had job-specific as well. So it's sort of a mixed bag I think that end up being in that, in that group.

That's kind of the summary that we came up with as far as where I think we're left as far as the issues. Are there any comments on that before we get into probably more specifics?

DR. TAULBEE: I don't have any comments right now. I think I do want to come back to

some of this after doing a couple of my talks to try and address some of the disagreements, concerns we had with this.

MR. FITZGERALD: All right.

DR. TAULBEE: But not at this time.

MR. FITZGERALD: Okay.

CHAIRMAN CLAWSON: That being said, do we want to take a break? Is it time for a break?

(Chorus of yeses.)

MR. KATZ: Okay. How about 10 minutes, 15 minutes?

CHAIRMAN CLAWSON: Fifteen minutes.

MR. KATZ: A 15-minute comfort break. So, it's 10:07. So about 10:20 let's get back together.

(Whereupon, the above-entitled matter went off the record at 10:07 a.m. and resumed at 10:22 a.m.)

MR. KATZ: Well, who's up?

MR. FITZGERALD: Actually, I think we've finished the general presentation. And Ron was going to say a few words on the 773-A review that's on the agenda.

SC&A Response to NIOSH report on monitoring of CTWs in Bldg 773-A High Level Caves

DR. BUCHANAN: Okay. This Ron with SC&A. This is RPRT-83, which is a report issued by NIOSH in June of this year. And it's titled "Evaluation and Monitoring of Construction Worker Identified in High Level Cave Job Plans at the Savannah River Site." And this was issued to determine how many were monitored in the caves.

Now, these were high level caves apparently where they handled plutonium. And so they had some job plans for 1980 through 1986 for Building 773-A. And the purpose was to address the sub construction trade workers were monitored different from the client construction trade workers doing the same type of work.

And so I'll give a little bit of background of what was done here and then our critique of it. We haven't issued a report on this. We hope to have a formal report out in time for the Advisory Board meeting in December.

And a little background was that in this report they found job plans which was

something like RWPs, a plan of job. And so they found about a thousand workers identified.

And they looked at the ones that had a potential for exposure and found about 300 primes and about 350 sub construction trade workers. And they broke the analysis down into two parts, external and internal monitoring.

And for the external the results were that 99 percent were found to be badged, externally monitored within the year. And we're not sure if that's -- the time periods were exactly matched up or if they just badged within the year. That's one area we'd like to get clarification on.

And that 97 percent of the sub construction trade workers were monitored. However there was no quantitative analysis on the dose distribution such as millirem per year.

The internal -- and then the attention was turned to the internal --

MR. KATZ: It may be a problem -- okay, so there's some people who have open lines. I can hear a background sound too.

So, would everybody on the phone please mute your phone? Press *6 to mute your phone, if you don't have a mute button. That might help some. Okay.

DR. BUCHANAN: Anyway, I'll just speak louder. I'll repeat, the external results were 99 percent was monitored for the primes and 97 percent for the subs, but no quantitative dose rate data provided.

For the internal, they found 255 sub-related jobs. There was no prime information. The subs, there were 255 job sub pairs. And they randomly selected 133 of those to look at. And they identified 88 sub construction trade workers that had respiratory requirements.

So they looked at the percent of those that were monitored on the job, usually within a year. There's some guidelines given in the report, what isotope they might have looked for, what time, according to the general rule of Savannah River Site monitoring practices.

Found that 67 percent had bioassays within a reasonable amount of time. And about 39

percent were on routine bioassays.

For internal there was no prime contract trade workers percentage given. And there was no quantitative bioassay data given for the primes or the subs.

Then on page 27, in conclusion, they conclude that dose reconstruction for subcontract workers can be done using external and routine or event-driven bioassays for the workers. And using coworker data or a combination of the two.

And when we analyzed this, what we were looking for was sort of eight pieces to the puzzle. And we found three. And to look and see if coworker data can be used to fill in for when they weren't monitored, we'd have to look at the external percentage. Which was given.

But we'd also have to look at the dose distribution to see if maybe one was one hundred millirem a year and another is five hundred. We don't know. So we don't know if we can use the coworker data from the primes to the subs.

And the same way with the internal. We don't know what percent of the primes were

bio-assayed for these jobs. And we don't know what the dpm per liter or what isotope data distribution was so that the subs and the primes were slightly similar.

So in this case, when we talk about using coworker data to fill in for the 33 percent that was missing from the subcontractor bioassays, we're not sure what coworker data they're talking about. And is it going to be separated into primes and subs, or it's going to be all lumped into one? That's, in other words, was their stratification in these dose rates and intakes?

And secondly, we'd like to say that, even if this is worked out, we would caution against applying this information to other areas or job titles at the Savannah River Site or other times in that considering this was a high level industrial exposure and it would be different probably from the waste facility or even some other production lines or other facilities.

And so to extend this to other time periods, it would require justification and

documentation that would be applicable to other areas.

And like I say, we plan to have a review out, a report to the Board at the meeting. That concludes my evaluation. Any questions? Comments?

DR. TAULBEE: Just look forward to the report so we can address your concerns.

DR. BUCHANAN: Okay. Thank you.

CHAIR CLAWSON: Okay. This is Brad. With that being said, I guess --

MR. FITZGERALD: We have some comments on the stratification memo.

Is Bob Barton on the phone?

MR. BARTON: Yeah, Joe. I'm here.

SC&A Response to Taulbee memo regarding stratification of CTW data between DuPont construction and Subcontractor construction for Pu and Tritium.

MR. FITZGERALD: Okay. You know, Tim sent out a memo addressed to Jim Melius and Brad, I think it was in September, on dealing with the -- basically I think it was the stratification

issue. And this was presented again today.

And I wanted to just comment. Because we thought it was a good review, but the results seemed to be a bit mixed in some places. And we wanted to focus on that question, because I think this notion of looking at the subcontractor population and how it compares with the CTW, I think obviously is a very germane issue when we're talking about how to develop the coworker models.

So, Bob has looked at that. And looked at the graphs that we had, not the latest ones, but certainly some of the graphs that we had earlier. Although I think they're pretty similar, aren't they?

DR. TAULBEE: They're the same.

MR. FITZGERALD: The same graphs. So, Bob, you want to take that?

DR. TAULBEE: Bob, do you need to present here?

MR. BARTON: Actually, if I could just take over real quick. Yeah, I did pull out just some screenshots from that memo as sort of a

talking point.

DR. TAULBEE: Okay.

MR. BARTON: So just give me one moment here. Okay. So it says it should be presenting my desktop.

DR. TAULBEE: Yep. It is.

MR. BARTON: Okay. So, again, these are the same charts. You saw this one already from the memo you sent, Tim, back in September.

And, again, we're really going to just focus on the plutonium results here, because I think, that's where we feel we maybe interpreting things a little bit differently.

So, you saw this chart. And the only point I'm showing this, as Tim already discussed in his presentation, was that you see here in the 1980s there's a significant uptick in the number of subcontractors we've seen, at least in the claimant population that was evaluated.

And as you can see, right around 1985 the amount of subcontractors actually surpasses the amount of DuPont construction trade workers.

And we saw this graph before too. And

this is, again, the plutonium results. And it compares the DuPont construction trade, subcontractor construction trades, and also added in, as it said in the report, "for completeness, the non-construction trade workers."

And so as I was looking at this chart, and there's clearly a lot of variation by time. And there's a lot going on here.

So, one of the things I thought was, well, let's just look at, you know, the post-1972 era where there currently isn't an SEC for Savannah River.

And also, since we're really just talking about a comparison between the subcontractors and the DuPont construction workers, I went in and just erased the blue line, which was the non-construction trade worker population.

And this is what it looks like. So again, this is the same chart. I just tried to erase the blue line. You can still see some remnants of it there. And, again, we're just kind of looking at '72 through '88.

Now, when I look at this, to me it tells a little bit different story than what the memo concluded, in that you see these large spikes in here, especially beginning around 1976/'77, in which to me it certainly looks like, visually, that the subcontractor population is a different exposure profile than the DuPont workers.

Now, in your presentation, Tim, I noted that you said that "in the last five years," so we're really talking about '84 to '88, you know, right here to here. You had said that three of the years were higher for subs and two of the years were lower. I mean, I'm looking at it and I only see 1988 as being lower for subs.

And I'm not sure if that's --

DR. TAULBEE: In 1987 they're pretty equal. The DuPont construction are slightly higher. But, again, the scale on this is -- we're looking at 95th percentiles here.

MR. BARTON: Right.

DR. TAULBEE: On this particular graph. If you look at the box plots you'll see

that they're actually much more similar.

MR. BARTON: Well, it's sort of being proposed that we're going to be -- the proposal is that we're going to be looking at the 95th percentile of the coworker model. So I think it's appropriate just to talk about these.

DR. NETON: Well, the coworker model is different then what you're seeing here.

MR. BARTON: These are the OPOS results. I understand that.

DR. NETON: Yeah. But you know how we fit coworker models. The 50th percentile is fit and one GSD is fit. It's a smooth function through those data points. Not smooth, but using those data points.

MR. BARTON: Right. These are just the time-weighted OPOS results. I hear --

DR. NETON: Right. This is not a coworker model here. This is just --

MR. BARTON: I'm not sure -- I understand what you're saying, but, still, this is meant to be a comparison of exposure profiles between the subs and the DuPont workers.

DR. NETON: Correct.

MR. BARTON: So it is relevant to compare this chart. And I'm going to move on. This is a quote directly out of the memo. And I'll read it out.

"For most years there is little difference in the 95th percentile urinary excretion between DuPont CTWs and subcontractor CTWs. The exception appears to be in the later 1970s and 1980s. This observation is somewhat supported by contemporary interviews with subcontractor CTWs. Subcontractor CTWs indicated that they were called in for more contaminated work to save the exposure of the onsite CTWs.

"For some years, 1977 and 1979, and 1984 to 1986, this appears to be the case in that the 95th percentile of the subcontractor CTWs is a factor of two to five higher."

To me, that seems pretty significant. And then in the concluding paragraph of that memo -- again, these are directly out of the memo.

"We believe that these graphs support our conclusion that there is no systemic

difference between DuPont construction trade workers and subcontractor construction trade workers. While there are a few years that had plutonium bioassay for subcontractors higher, there are multiple years where the tritium dose is lower."

I mean, first off, the relationship between the magnitude of plutonium bioassay and tritium, they're unrelated, in my view. So, you know, the fact that the tritium doses on an annual basis are higher for DuPont workers then subs, doesn't seem really relevant when we're talking about plutonium.

And really, in the years of interest we're looking at, as it notes, you have a factor of two to five differences in those urinary excretion rates for subs over the DuPont workers.

So, I mean, we look at that and, purely under the guise of plutonium, we really question whether these are in fact a similar worker population or if the subs did have a higher source of potential than the DuPont workers.

And throw in the fact that we have at

least anecdotal evidence, but this data seems to support that notion, that they're bringing in subs to do the more highly contaminated work.

So, that's sort of our view on the comparison that was done. And, again, it's sort of subjective, in a way. You can look at the data and sort of make your own determinations. But, again, we look at post-1972 and just the comparison between subs and primes.

I look at that data and personally I don't feel that it says that they're the same exposed population. So that's really our commentary on that specific part.

DR. TAULBEE: Okay. Can I comment on this? Okay. Can you stop presenting there, Bob, and give me control? I want to go back to one of my slides on the key issues.

MR. BARTON: Sure. I think you can actually just take control of it.

DR. TAULBEE: Oh, I can?

MR. BARTON: I stopped presenting.

DR. TAULBEE: Sorry. Here we go. Alright. This is the one that I want to kind of

focus on here, to start with, to address your concern there of why I'm saying that I'm not seeing any systematic difference.

Now, if you look at just the 1972, from this box plot, up through 1988, you will see that the majority of the data, which means 75 percent of the data, is all below .1 dpm per day. So what we're looking at in that next plot is that upper tail, that 95th percentile bouncing around.

And, yes, I do believe that in some years they brought in some construction trades workers for some hot jobs. And that's why you see the uptick in that 95th percentile.

But when you get out there to the 1984 type of time period, you'll see the bulk of them are matching very well. You'll see that 75th percentile, which is the upper part of the box, is very consistent between DuPont construction trades and the subcontractor construction trades.

You do see that there are some instances. I would certainly not say it's systematic that they were continuously brought in

for just high jobs and that they were the only ones brought in for high jobs. That's not consistent with this data.

You see that they are actually quite close all the way through, with a few upticks in both of them. And if you look at the last five years there, you're looking at, you know, three that are higher and two that are -- well, one is equal and one is lower.

So, that's why I come to that conclusion. It's not just that 95th percentile plot. Looking at all of the data.

Westinghouse Savannah River Corporation (WSRC) era: 1989-1998

NIOSH Response to SC&A report on subcontractor monitoring and effect of 10CFR830 violations

MR. BARTON: Well, then I guess to sort of talk about our main concern here. We are talking about that sort of upper tail of bringing in subs who -- if you're going to bring in a subcontractor to do a hot job that's most likely going to be your transient workers.

And they're most likely going to be on

the site to do that dirty job and then to get burned out on that job site.

Now, that's the group of workers who, in my mind, would be most affected by these job-specific bioassays. Because they're only coming on for a short time to do a dirty job, they're likely not going to be on a routine program.

So, I understand your point about, when you look at the entire data set that, you know, in the middle there's not that much fluctuation. But I think we are concerned about that upper tail, because those are the workers who would most likely be affected by that RWP-required bioassay program.

So I do feel that that upper tail is relevant to these discussions.

DR. TAULBEE: Okay. I will address that component next, the job-specific issue, during my presentation.

Are there other questions?

CHAIR CLAWSON: No, I don't have any. So the next thing we have is Westinghouse Savannah River era, 1989 to 1998. NIOSH response

to SC&A's report.

MEMBER LOCKEY: Can I ask you a question about this upper tail? Do you know the number in that? What was the number of samples in that, do you have any idea?

DR. TAULBEE: I don't. But we can get that. I don't have it off the top of my head. Can you look that up, from those box plots? How many people were used in those last five years used to develop that plot.

MEMBER LOCKEY: Per year. Just per year, I'd like to know.

DR. TAULBEE: Yeah. Oh, actually, it is there. I'm sorry.

MR. BARTON: Tim, that's one of your graphs. It's just the number of workers, prime workers --

DR. TAULBEE: Yeah, I'm sorry. On the previous -- or the very next page. I'm sorry. Flip to the next page. The next one after that. There it is.

MEMBER LOCKEY: Okay.

DR. TAULBEE: That's the number of

people. And you'll see the subcontractors are dominant in those latter years. There's more of them than there are construction trade workers -- or DuPont construction trade workers.

Yeah. If you could bring up that second presentation. That will work. Oh, wait a minute. Jim had it the last time.

(Pause.)

MR. BARTON: Well, I guess while things are getting set up, if I can just maybe elaborate a little bit more about that concern.

Again, the main question to me is obviously representativeness. And when you have a transient worker who's probably brought in for a hot job and maybe had an exposure potential, just based on the bioassay, that's two to five times higher, is the 95th percentile of the entire construction worker monitoring population, that includes everybody, truly going to be representative of that upper tail? When they're transient, onsite for a short time, and they may not have complied with the job-specific requirements of whatever job they were working

on. That's really our concern.

DR. TAULBEE: Actually I think I got it. All right. Okay. So what we want to try and -- we reviewed SC&A's evaluation on SRS subcontractor bioassay for data completeness. And we had some concerns with it. And that's what I want to try and discuss here.

But I think, in the course of discussing this, a lot of things are going to come to light as far as how they were monitoring workers. And there's some misunderstandings that I actually had before we got this latest response from the Savannah River Site as to how they were monitoring people on routine versus job-specific bioassay.

So, if you bear with me here, this is kind of a lengthy presentation, but I think you're going to find that at least it's informative.

The first thing I'm going to focus on is the subcontractor analysis and then our concerns with SC&A's report. And then we'll get into the evaluation, the notice of violation, and

how the monitoring, their methodology, led to the violation and why it's at 10 CFR 830 and not 835.

So, again, just to recap, and these are the numbers that we've been discussing all morning so far. In our analysis, we evaluated job plans, 67/68 percent. It's actually 68 percent. We found an error when we added in the coworkers that we had missed somebody. So there was an additional person that changed that up by one percentage.

The subcontractors had direct bioassay monitor. If you consider somebody working on that same job plan, we looked at whether they were monitored. We have 92 percent of the subcontractors with either direct monitoring or a coworker on the same job plan was monitored -- job plan or RWP.

Okay. In SC&A's report, their full analysis of all RWPs in the 1990s found a 66 compliance rate. They found 201 of 306 people had bioassays. And at the 30,000-foot level, you know, I looked at those results and I'm like, okay, that's similar to ours. And then the 90-

day, there's increases to 244 out of 306, or an 86 percent compliance rate.

When they looked at just at RWPs that specifically indicated bioassay, the numbers got a little better: a 71 percent compliance rate and an 84 percent compliance rate.

Now, our concern is the use of the 30- and 90-day criteria for bioassay. Thirty days is appropriate for tritium. In fact, 100 millirem tritium detectable dose -- or a 100 millirem of tritium dose is still detectable after 70 days.

So, the 30 days is perfectly fine for tritium, although you should be aware that the site did use what was called T30 bioassay monitoring, to where if you worked in a tritium area you only had to leave a sample once every 30 days. That was part of their monitoring criteria.

Per procedure, the annual monitoring was usually a requirement for non-tritium actinide samples. Thus SC&A excluded a significant number of the subcontractors from their analysis, and indicated that they were not

monitored.

So that's really our finding here that I'm going to go into more detail here. In our case, we believe the bioassay data should have been separated into tritium and non-tritium in the appropriate time intervals used for the evaluation.

So, the other thing that we came up with, or looked at here, is there's kind of a misconception about radiological work and monitoring at SRS.

If a worker was only required to leave a non-tritium sample once or twice a year, such as plutonium, enriched uranium, or strontium, then the 30 to 90 day criteria is not appropriate. You're going to see a sample once every 180 days if they're on twice a year.

In the 1990's radiological work control they had it to where a worker had to attend radiological training, Rad Worker II. They signed in on an RWP. And the worker was to check their bioassay code on the radiological qualifications card, or badge, against the RWP

requirements.

So here's what the radiological qualification cards look like in 1994. You can see the Rad II off to the left. That's indicating their training. They're Rad Worker II trained. Their radiological qualifications. This one here, they had a whole body count, chest count. And the date of when they needed to get the next one, that's when that one expires. And then their Rad Worker training, you'll notice they all kind of correspond there. And then the bioassay codes.

And here you've got a bioassay code example here of Pu-02, EU-02, and Sr-01. That would be, plutonium-02 is plutonium twice a year. EU-02 is enriched uranium twice per year. The strontium-90 would be once per year.

Now, people who are more heavily exposed would likely have Pu-04, where they were on quarterly plutonium bioassay. So it was a graded approach as to what was your potential. And this is the radiological qualification cards.

The second misconception about

subcontractor monitoring is that job-specific bioassay was not the only manner in which subcontractor construction trades were monitored.

A significant fraction were monitored via routine or prescheduled bioassay based on the radiological qualification card. And we'll demonstrate this later in the very next presentation.

This is the actual subcontractor monitoring. This came out of the corrective actions report, which was over 100 pages, or around 100 pages, that the site did. And I'll show later a slide of what they thought was happening. This is what they determined was actually happening. Okay?

And I'll go into this in more detail in a little bit, but what I want to point out here is box one, the worker signs in on an RWP requiring bioassay sample.

And so that's what SC&A was looking at with their RWPs. And when we were doing our job plans we were surrogating or saying that if they

wore a respirator, we are assuming they had to leave a bioassay sample.

The next block is worker participates in a routine bioassay sampling for radionuclide specified on the RWP. This is where the worker checks their badge. Are they supposed to be monitored for plutonium? And does the RWP say plutonium?

And if it's yes, the worker doesn't submit a sample. The worker submits a sample on their routine schedule when they were required to. Not for that particular RWP.

So if you've got two subcontractor construction trades worker signing in on this RWP, and the first one has plutonium indicated on his radiological qualifications badge, he then goes over and doesn't submit a sample for this particular job, because he's on a routine that he will be picked up six months later or a year later, depending upon what his schedule is.

If the worker, the second worker, doesn't have plutonium indicated on his radiological qualifications card, then he's got

to submit a job-specific bioassay.

So you've got a split going two ways depending upon whether they were -- or whether they had the qualification for that RWP or not.

So, that's where the split goes. You've got two workers on the same RWP. And it depended upon whether they were on a routine program for that radionuclide or not.

But what our concern is, is that SC&A just jumped from box one to box two and said it's got to be within 30 to 90 days.

Well, if you do that, if a subcontractor was not scheduled to leave a sample for another hundred days, there won't be a sample. If they were on a routine schedule and they end up with -- they sign in on this RWP, they're supposed to leave a sample in another 100 days, they did. In most cases, I should say.

So we went back with this and reevaluated the data that SC&A had for tritium. We broke it out into tritium and to non-tritium samples, the actinides, and we did a reevaluation. So, what we found was there was

108 of 119 subcontractors on RWPs that had potential for tritium exposure that they had bioassay data. We're looking at 90.8 percent.

The mean number of days between the RWP and the bioassay was seven and a half days. But for tritium, less than 30 days. That makes sense. That was a reasonable criterion, but you needed to break out tritium versus non-tritium.

89.2 percent of these 108 were on a routine prescheduled monitoring. Now, these are all subcontractors on routine monitoring. This is that T30 that I was talking about. Had to leave a sample within 30 days of their work in the areas.

When you go and look at coworkers on that same RWP, you've got 117 of 119 were covered by either their personal data or a coworker on that same RWP had monitoring data within the criteria.

Now, since 1972, I want to point out, with tritium, the 95th percentile subcontractor tritium dose is less than 100 millirem. And it's got a downward trend as you get into the latter

years.

Now, since 1980, DuPont construction trades workers have been less than 100 millirem. Now, 100 millirem is the threshold for requiring monitoring. So the vast majority, in fact 95 percent of these workers, by today's standards, don't need to be monitored. But they were. And they still are.

So our conclusion is really tritium monitoring of subcontractors is not really a dose reconstruction problem.

Now, we also evaluated the non-tritium. And, again, the misconceptions about how the bioassay monitoring was going led SC&A to exclude a significant number of samples from their analysis.

SC&A only identified 62 non-tritium bioassay. Oh, and I should mention, the prescheduled for the non-tritium bioassay are generally conduced on semiannual or annual basis, on or near the birth date and six months later. That's how they were scheduled to be monitored. There was a limited number, primarily due too not

looking at samples outside of 30 and 90 days.

We reevaluated that data and found 102 subcontractors on the RWPs that had potential for plutonium exposure. Eighty-nine of the 102, or 87.3 percent, have bioassay data. The mean number of days between the RWP and the bioassay was 125 days. Again, this is that semiannual or annual monitoring.

Eighty percent are on routine, prescheduled bioassay. If you again consider the coworker, we've got again 98 percent of the subcontractors are covered by either their personal data or their coworker who signed in on that RWP had a bioassay sample.

In their conclusion, SC&A concluded that the bioassay data set for CTW subcontractors specifically, and CTWs generally, is demonstrably incomplete for 1989 to 1998, and likely before that time period, and does not satisfy the criteria set forth in NIOSH's draft criteria for evaluation and use of coworker data sets.

We disagree. We believe that 90.8 percent and 87.3 percent direct monitoring of

subcontractors is not demonstrably incomplete. We feel that their sampling was really pretty reasonable. It's just you needed to look beyond that 90 days as to how the site was monitoring it.

Before I go on, questions? Comments?

MR. FITZGERALD: Yes. Just one reaction. If Westinghouse would have conveyed this same kind of perspective to DOE, would not have -- would not that have, you know, responded to their issue about incompleteness? I mean, it just seems a little bit of a disparity between this perspective and the fact that, you know, DOE looking at the results, and the resampling to boot, basically acknowledged that there was non-participation.

And, you know, the non-participation wasn't just people didn't get their bioassays for 120 days. You know, they weren't available. And that's why the resampling. So, it just seems to be an incongruity there, that everything was fine, that actually they were 90 percent complete. Did DOE just misunderstand the

bioassay program at Westinghouse?

DR. TAULBEE: No. I think you're going to see, in the next slide, in the notice of violation, of why it became a 10 CFR 830 for procedural violations.

MR. FITZGERALD: Well, I'm not talking about compliance. Not the compliance context. Just the notion that, you know -- I understand where you're going with the plutonium bioassay and the fact that it eventually did get, you know, whether it's within a year or so.

But clearly, in terms of the completeness issue and the fact that they were cited, that certainly didn't seem to be factored in at all. I'm just trying to reconcile that.

DR. TAULBEE: Actually, I believe it was.

DR. NETON: We're looking at a different issue here, though. We're looking, you know, whether the subcontractors are on a routine monitoring program. And I think Tim has demonstrated that they were. And so, you know, you only have a very percentage of this bioassay

set that weren't left in that non-compliance.

MR. FITZGERALD: Yeah. And one thing that in the --

DR. NETON: And so what percentage of those were -- you know, if a lot of the subcontractors were on the routine monitoring program --

MR. FITZGERALD: Let me just throw out a question I've had too. You know, we've been focusing on subcontractors because that was the entry point to the discussion. But, when we look at the job-specific bioassay issue, it's unclear to me who actually made up the workers that were on job-specific bioassays. I think a lot of them were specific subs, but I think, you know, a lot of them were CTWs. It was a mixed bag.

And really the data, if there's an incomplete set of data, it's sort of centered on those that were subject to job-specific bioassays where their participation is lacking, that data wasn't collected. And what I've struggled with is, it's not so much, given that finding, or given that revelation, it's not so much of a

subcontractor issue per se.

It's just how do you deal with the missing data or the non-participation for that set of workers, whoever they are, whatever niche you have in terms of reconstruction? How would you mitigate the -- do you see where I'm coming from?

DR. NETON: But isn't that a coworker issue?

MR. FITZGERALD: Well, I'm just saying --

DR. NETON: I mean, that's why you have coworker models, for performing that kind of monitoring.

MR. FITZGERALD: Well, I'm just saying, in this is a coworker model, we're dealing with a strict definition of subcontractor or CTW. We don't know exactly who this group would be over time. We do have some notion. We could actually establish for '97 who they are.

DR. NETON: Stay tuned.

MR. FITZGERALD: But I'm just saying, you know, that's going to be a changing

demographic, if you may. And, you know, I'm not so sure it's just a subs issue.

But anyway, I'll let that ride, then. We can cover that when we get to it. I haven't looked at -- I haven't looked ahead enough to know.

MR. HINNEFELD: Tim, what you've talked about so far, though, was the SC&A evaluation of bioassay where they got the RWP.

DR. TAULBEE: That's correct.

MR. HINNEFELD: Reportedly not very complete, you know, not very clear in terms of what the RWP actually required. Or, you know, in terms of the RWPs they looked at. And they've looked at their study, which shows, even in their arithmetic, 60 to 70 percent complete.

But the real focus that was missing was actually Savannah River's self-evaluation. That was really the focus of it, that was the conclusion and the subsequent NOV. That's really the data set that says, well, 70 percent or so didn't comply with, you know, on the face of these things.

So, really, the discussion of SC&A's report is, to me, secondary to what's in the discussion on the NOV.

DR. TAULBEE: Well, yes and no. Yes, I agree. But let me get at --

MR. FITZGERALD: I have some responses.

DR. TAULBEE: Because the 79 percent is on a very small fraction of people that go under the job-specific path.

MR. HINNEFELD: Yeah, I understand that.

DR. TAULBEE: Okay.

MR. FITZGERALD: And I was going to make the same point. But there's other points -- why don't you go ahead and complete. And then I can come back and --

CHAIR CLAWSON: I just have one question. You kept calling out that 100 millirem to tritium. Under the 835 wasn't it the total dose of 100 millirem? Not just one isotope, it was the total. Correct?

DR. TAULBEE: Yes. Of all

radionuclides. Yes.

CHAIR CLAWSON: Okay.

DR. TAULBEE: But if you're a tritium worker for all the radionuclides and you're doing work in a tritium facility, then -- this is what they saw.

CHAIR CLAWSON: And then you have the plutonium and uranium or whatever else that you can get into.

DR. TAULBEE: Not in the tritium facilities. It's not there.

So -- but, I get what you're getting at. Subcontractors might be going to different places. Correct.

But from a tritium standpoint alone, if they were just working at the K Reactors for the restart or something like that, that was their dominant exposure.

CHAIR CLAWSON: Well, this is one of the issues that I have had from the very beginning. And why I've called Savannah River an interesting site.

Because you have -- at most sites you

have a home base of workers that are considered the site's workers. Savannah River you have -- you have trades that are coming in.

These trades come and go. And as we've seen, and in the interviews, they could be burnt out and go out on the road for 60 days and work a total other job.

And then come back in at the new year because they're clean and fresh and they can go. Part of the problem that we've heard from the people that we have interviewed is that in doing that, you are not -- you're not into a routine process.

You have both sides of the spectrum. You have a group of construction trades that are house, so far. But they can be utilized and their manpower has always gone up and down all the way through the year.

And then you have other construction trades that come in and that are working a new job or a new process that is going on. I really don't know how you're going to separate all that out.

But, that just being said, this is why Savannah River is a unique character in itself. It's unlike that at any other DOE site there is.

DR. TAULBEE: The information I just presented is strictly subcontractors. Only those coming in for those peaks and valleys.

This is not any of the DuPont construction trades workers. We didn't include those. And we're not looking at any of the DuPont workers.

Okay. So this is just subcontractors we are now analyzing.

CHAIR CLAWSON: Right. And understand as these ramps -- because I've heard this so many times, they were working for DuPont for four to five years as house construction people. And it dips down, they get laid off.

They go to the hall. And the next week they're out working a construction job out there. And also, some of them would rather have worked the construction because it was better pay.

So, I just -- the influx back and

forth is very unique. And I -- that is an issue that we're going to get into.

But, I'll just let it at that. I just wanted to make sure, because you were saying 100 millirem of tritium. My understanding the way that this was put is 100 millirem period.

Everything combined.

DR. BUCHANAN: External and internal.

CHAIR CLAWSON: External and internal.

DR. NETON: No. They're separate source terms.

CHAIR CLAWSON: They're separate. Yeah.

DR. NETON: Internal and external are separate source terms.

MR. FITZGERALD: Yes, I went through this. Yes. Before -- you're going to get into NOV next, right?

DR. TAULBEE: Yes.

MR. FITZGERALD: Okay. If you don't mind, this is a good, you know, split point just to maybe comment on your comments. On the report.

You know, just -- and you were

actually with us the whole way. So, I think you recall some of the genesis of the 60 to 90.

And we went into looking at this thinking that we would have very explicit RWPs that would, as, you know, convention would have it, identify the specific source term nuclides on the RWPs that would specify, you know, when these would be collected.

And we looked at these RWPs, and I've said this before, but I'm going to emphasize this again. Because the practical approach was definitely affected by this.

You had cats and dogs in terms of RWP forms. Some were very explicit and said end of job. Very specifically whether it was actinides or tritium, it was end of job bioassay.

And then you had others that were undefined and very general. Now I understand the split plan and the process.

But when you're dealing with subcontractors, particularly transient subcontractors, the context of what you're looking at is these guys came and went. And if

they had job-specific bioassay for whether it's actinide or tritium, the fact that they were subcontractors, certainly look at them from the context that you would sample them before, you know, certainly before they leave. Or certainly if they were transient.

And so the -- and it made a supposition you say it wasn't necessarily true for the actinides. But we were looking for an indication that if they were doing a plutonium job that the subcontractor would be monitored within a few months, if nothing else because that subcontractor may not be around to be sampled in the first place. So the context was, did they in fact follow up the job with a sampling.

And I understand the notion that at some point later, there would be a bioassay perhaps. But I want to throw out here, is that assumption for a, you know, quote subcontractor, particularly in the vein of the ones that are coming and going as far as the site was concerned, you know, whether that assumption was a valid one or not.

So what we did, frankly, when we found out the RWPs were so incomplete that we only came up with maybe a dozen, was to not even try to establish a specific -- and this was an actinide, look at a specific end date.

But I do recall deciding, okay, given the benefit of the doubt, if we could see any indication of bioassay, even if the bioassay didn't necessarily match the identity of the nuclide on the RWP, we would give them credit. Just because it was the index.

And we recognize that point that we only had a sliver of the RWPs. And therefore did not even have a representative sample to evaluate.

And with the RWPs that we did have, we did not even have a clear picture. And this got uglier and uglier as we got deeper and deeper into this thing.

And realized that no, we could not really do a representative sampling. So the decision was to provide indication using, in a sense, a short form, 60 to 90 -- 30 to 90 days as

some indication of whether or not there was completeness or not.

So again, I want to emphasize that context because there certainly wasn't the opportunity to do the kind of data searches that have led after the fact to a slightly better understanding of that.

But I would still contend that if you had a transient subcontractor doing a job with actinide source terms, and you did not sample that person, certainly within a few months, there was a good likelihood that person's gone. So it's certainly that question.

You might pick him up at some future job. But, there's certainly no surety that you will.

So I just wanted to throw that out as a comment.

The other thing --

DR. TAULBEE: Can I comment there?

MR. FITZGERALD: Oh, sure.

DR. TAULBEE: Okay. You know, 30 and -- 30 days is fully appropriate for tritium. And

there's no problem with that.

It's the non-tritium is where our real concern is. And then combining the two together.

From the standpoint of the transient workers, you're right. They may not come back. And actually in our analysis, you know, we showed that 13 percent didn't leave a bioassay even though they were supposed to.

So, you know, you're right on that. Some of them did not come back. But does that mean we can't estimate the dose to that 13 percent that we didn't see based upon the 87 percent that did?

So, that's where the coworker comes into play here. And that's why when we looked at the other, you know, somebody else on that RWP, were they monitored, and we get 98 percent.

So, I understand. You're absolutely right. They may not have -- they may have left the job and never came back, and never left a bioassay sample.

And what we saw in this analysis is about 13 percent did not leave a bioassay sample.

MR. FITZGERALD: Okay. You know, certainly I don't want to belabor this. But, I think one of our concerns though is some caution about making assumptions about RWP work.

Again, I think this notion that one can generalize and apply other data, meaning whether it's routine sampling data, or even other job-specific bioassay data.

One thing that I thought Savannah River did very well, and Westinghouse did very well in '99, was stressing -- be very, very careful. Because the jobs we're talking about, whether it's a waste management job where you got a complex source term.

Whether it's a one off type of job where you're dealing with something that's, for example, and actually it did provide an example in a couple of memorandums of where, you know, you had a plutonium worker that was diverted to do a one off job, and that happened to have an americium source term and was central to that particular job. But the danger was that because the RQB had Pu on there, that unless they

characterized that specific job and included that on the RWP, there would be -- the americium would be unmonitored.

And so my concern with this whole group, quite sincerely, is that we're dealing with -- on job-specific bioassays we're dealing with specialized work in some cases.

Where it's not likely you're going to be able to generalize a dose distribution that you can apply from another data set. And if it weren't RWP work and it weren't this sort of, this question of one off jobs or unique mixtures of source terms, I'd feel more comfortable.

But I haven't heard something that makes me comfortable that you can apply, even if you were to take subcontractor data, apply it in a general sense and be confident that that would bound it.

But that's getting into another area. But when I hear you say that it gives me some concern there.

This second misconception about subcontractor monitoring -- I'll key in on your

--

DR. TAULBEE: That's fine.

MR. FITZGERALD: I don't think we actually made the case that there weren't subcontractors on routine sampling. I think actually subcontractors weren't as monolithic.

They just came in and did job-specifics. Actually I think they did a number of different things.

Some of them stayed on and did a lot of K Reactor restarts. So they were there for a while.

I mean, the K Reactor restart lasted a couple of years. So, I, you know, I would think a lot of them were on routine tritium bioassay sampling.

So, if somehow, somewhere we inferred that or whatever, I don't think we certainly meant it.

DR. TAULBEE: Well, the inference is with your notice of violation. In that when you say that the subcontractor monitoring data was 79 percent incomplete. That's where you're

inferring that.

MR. FITZGERALD: Well, okay.

DR. TAULBEE: That they are only monitored that way. And then --

MR. FITZGERALD: Right. I think subcontractors were broader. And I think -- and as I said earlier, I think the workers affected by the job-specific bioassay isn't exclusively subcontractors.

DR. TAULBEE: That's correct.

MR. FITZGERALD: I think we have a mixed bag. We don't know what that mixed bag is year to year.

But we might know it for '97. I don't think we can extrapolate it before then. But, you know, we sort of got into this with the subcontractor context.

But, having gone through it and looking at things like the NOV, it's pretty clear that the -- if there's a tag line, it's the workers that were on RWP required job-specific bioassays. If there's an issue of completeness, it's that group.

And I don't frankly know what the group is per se.

DR. TAULBEE: But your characterization there of workers who are on job-specific RWPs, I don't believe is correct.

MR. FITZGERALD: Okay.

DR. TAULBEE: It's an RWP that requires bioassay. And then the worker is checked to see whether they were on a routine bioassay for that radionuclide. They didn't have to leave a sample if they were not.

MR. FITZGERALD: Right.

DR. TAULBEE: Then they had to leave the job-specific.

MR. FITZGERALD: Okay. So, it's certainly not that --

DR. TAULBEE: So, it wasn't the job-specific RWP.

MR. FITZGERALD: It's a job-specific bioassay.

DR. TAULBEE: Yes.

MR. FITZGERALD: Let me be very clear about that. Okay. A job-specific bioassay.

DR. TAULBEE: Yes.

MR. FITZGERALD: Okay.

DR. TAULBEE: Because they weren't on a routine monitoring for the program. Okay.

MR. FITZGERALD: Okay. So then the --

MEMBER LOCKEY: Joe, I just want to ask you a question. So you're worried about the RWPs and that 13 percent that you have no data.

Is that what you're talking about?

MR. FITZGERALD: Well, it may not even be 13 percent, you know, we're basing this on a snapshot in '97.

I mean, that's kind of the only place we have any markers, data. And my question is, if you looked at that question of completeness over time, meaning from the '90s on.

And particularly in the early '90s when there was a whole big influx of these subcontractors.

MEMBER LOCKEY: It's less than 21 percent had samples.

MR. FITZGERALD: Well, you know, the

one concern I have too, is that given the variables involved and given the disparities of how you count percentages, who knows.

I mean, it could be 15, 20, 25, 30. I mean, but the question is, it's incomplete to some degree. And how would you address that incompleteness?

What data set would you apply to model that so that you could in fact come up with a distribution that would be bounding? And that's the part where I have a problem with the job-specific bioassays.

MEMBER LOCKEY: Okay. So let me -- so let -- there were 79 percent that weren't -- it was '97? What's the date?

MR. FITZGERALD: Ninety-seven.

MEMBER LOCKEY: Ninety-seven. Seventy-nine percent in that it was five percent weren't monitored. In that five percent, 79 percent.

MR. FITZGERALD: Right.

MEMBER LOCKEY: Okay. So we're talking about a relatively small population, I

think.

MR. FITZGERALD: For '97.

MEMBER LOCKEY: Yeah. And --

MR. FITZGERALD: All we know is '97.

MEMBER LOCKEY: Seventy-nine percent were not monitored.

MR. FITZGERALD: Right.

MEMBER LOCKEY: Is that true -- is that 79 percent true?

DR. TAULBEE: No.

(Simultaneous speaking.)

DR. TAULBEE: -- being misconstrued here. Let me go through this, if this is okay.

MR. FITZGERALD: Well, this is the NOV. Yeah, why don't we go to that.

DR. TAULBEE: This is the NOV. This is that '97 issue.

MEMBER LOCKEY: That's what I was trying to figure out. Is that true, is that 79 percent truly what they monitored? Or were they caught in this routine program?

MR. FITZGERALD: Well, that's what all we have, and you know, again, I think what Tim is

going to get into is additional documentation or details that we don't have. But, on some of that --

MEMBER LOCKEY: That's what I'm trying to figure out.

MR. FITZGERALD: But I can only tell you what we know. Which is not what he apparently has brought back from the last month or so.

But certainly the NOV that I'm talking about, what DOE cited Westinghouse on, cited those Westinghouse self-surveys that showed, you know, and if Westinghouse --

MEMBER LOCKEY: I understand.

MR. FITZGERALD: My concern is that Westinghouse --

MEMBER LOCKEY: I understand that. I just want to get to the 79 percent.

MR. FITZGERALD: Right. If Westinghouse can't get it right as far as where they stood as far as incompleteness, I'm not sure how we can do much better than that.

MEMBER LOCKEY: Yeah. Okay.

MR. FITZGERALD: Because that's --

those are their numbers. Not our numbers.

MEMBER LOCKEY: Okay.

DR. TAULBEE: So one of the parts of SC&A's report talks about the notice of violation. And they state, in the course of this review SC&A also established that a chronic history of wide non-compliance with job-specific bioassay requirements existed at SRS, resulting in a departmental notice of violation being levied in 1998. The implication here is that there is inadequate workplace and worker monitoring for radiological hazards at SRS.

And therefore NIOSH cannot bound the dose with sufficient accuracy. The further implication is that this affects primarily subcontractors.

Now, okay.

MR. FITZGERALD: Can I stop you right there now? I think you're taking it pretty broad.

DR. TAULBEE: I am?

MR. FITZGERALD: That there's inadequate workplace and worker monitoring for rad hazards at SRS. I think we were pretty

explicit about the fact that the -- for the job-specific bioassays you had, there was an issue.

Definitely an issue as far as completeness.

DR. TAULBEE: But from the SEC discussion, you're meaning that we can't reconstruct doses. That the workplace had major issues to where --

(Simultaneous speaking.)

MR. FITZGERALD: -- major completeness issues that would have implications for dose reconstruction.

I think that's exactly how we said it. Implications for dose reconstruction.

So yes. But I think what you're saying here is that there was SRS-wide inadequate workplace and worker monitoring for radiological hazards.

And I don't think we ever took it that broadly. We, I think, focused on job-specific bioassays. And certainly we tied it to subcontractors, which I think now knowing the makeup we would probably amend that to some

extent.

But, I think your first bullet is not accurate. I don't think we ever implied that the overall program was inadequate.

This says that the radiological program, the monitoring program for radiological hazards. I mean, that's pretty broad.

That's saying the entire Savannah River Site monitoring program was inadequate. I don't think we ever make that --

DR. TAULBEE: Well, an estimate -- or in designated special exposure cohort that's effectively what is being said. Is that the doses to workers cannot be estimated.

(Simultaneous speaking.)

MR. FITZGERALD: -- we have never gone -- and that's not even our -- that's not even our job to go so far as to suggest an SEC status.

That's the Work Group and the Board. All we said is, answer the question that the Board tasked us with. Which is --

DR. NETON: I would agree with Joe --

(Simultaneous speaking.)

MR. FITZGERALD: -- yes, we -- I mean, I want to be very clear on that though.

Because I think the question of completeness, I don't know if we have a disagreement. We may have a disagreement on the level of incompleteness, which I think is valid.

But I don't think we have any issue about the question of the adequacy of the program, monitoring program at Savannah River. I think -- actually I think there was major improvements to a sound dosimetry program.

I think it was on the administrative side, the procedural side which is what in fact they were cited on, where I think there were deficiencies which may have implications for dose reconstruction.

That's kind of what -- that's what I said in the very beginning. This jumps so far that --

DR. NETON: Yeah. I agree with Joe. I mean, I think maybe it's a little bit overstated. But I think Tim's analysis speaks to exactly what you're talking about.

MR. FITZGERALD: Okay.

DR. NETON: Which is the job-specific bioassay.

MR. FITZGERALD: Excuse me, I just wanted to clarify that.

DR. TAULBEE: Well, so data requests. Here's what we did since the last Work Group meeting. Actually before the last Work Group meeting.

We requested information from DOE headquarters and from the Savannah River Site regarding this notice of violation to learn more information. Because we really needed to know more of these details.

SRS provided over a thousand pages of information. We sent a letter to the Department headquarters and they just provided the final noncompliance tracking system report, which was eight pages.

And they indicated they didn't retain any of the other information related to the violation. So, we only have what SRS maintained.

We asked headquarters. And they

didn't provide it.

MR. FITZGERALD: And this eight pages is what we've seen.

DR. TAULBEE: It's the same report that I have.

MR. FITZGERALD: Right.

DR. TAULBEE: We sent a follow up request to the site in September 2017 specifically requesting those internal assessments that you talked about, Joe, that we don't have. There was one in '94, '95, '96 and '97 that were listed in the NTS report as well as other documents that we found in the thousand pages that Savannah River sent us.

Due to funding issues, turn of the fiscal year, SRS didn't have any money and were delayed in looking for these assessments. But they're working on it now.

MR. FITZGERALD: Now, just for clarification sake. These are the surveys?

DR. TAULBEE: These are the Westinghouse internal surveys.

MR. FITZGERALD: Westinghouse

internal surveys of completeness as far as they have?

DR. TAULBEE: That's correct.

MR. FITZGERALD: Okay.

DR. TAULBEE: So, let's look at this notice of violation and the details as to what it was. Because I think this is critical to this evaluation here.

What they were cited for was 10 CFR 830.120(c)(2)(i), which requires work to be performed in established administrative controls using approved procedures.

The second violation was similar. It was quality improvement, requires that one, processes to detect and prevent quality problems be established and implemented.

And two, that item services processes that do not meet the established requirements be identified, controlled, and corrected according to the importance of the problem and the work affected. And three, that correction shall include identifying the causes of the problems and working to prevent the recurrence.

This is what they were cited for. Now, let's look at the first one.

In their -- in DOE's final write-up, they indicated that -- and this is the part that Joe's talking about, from January 1996 to 1997, the Westinghouse Savannah River facility evaluation board reports identified that one, workers were on incorrect bioassay programs as identified by the radiation qualification badge, and consequently did not submit job-specific bioassays as required.

Line management did not always ensure that new employees were placed on the correct bioassay schedule. And again, this gets to what Joe's talking about some with the RWPs and were they on the proper schedule.

Bioassay schedule report was not always provided to line management for accuracy review. And job-specific bioassay sampling requirements were not always identified on the RWPs.

Okay, again that's one of the points that Joe pointed out. Bioassay assignments were

not always reviewed by personnel when they received an annual whole body count.

And this was the level of -- severity level two program, or problem. A civil penalty of $37,500.

Now, I want to focus on that first bullet point. Because that was the one that caused me the most concern of, were people on the incorrect bioassay schedule.

CHAIR CLAWSON: The bioassay program.

DR. TAULBEE: Right. Bioassay program. Which is the sampling schedule. So, just to reiterate that, workers were on incorrect bioassay programs as identified by their RQB. And consequently did not submit the job-specific samples as required.

The corrective action. Savannah River sent four thousand form letters on February 19, 1998 and mailed them to every site employee and subcontractor currently on a routine bioassay program, asking them to compare their bioassay codes on their radiation qualification badge, and those listed on the letter.

There were less than one hundred discrepancies identified. There were discrepancies, yes. They got fined for it.

They weren't 100 percent accurate. But we're looking at less than two and a half percent were on incorrect schedules.

So, did that affect the coworker model? That's my question for the Work Group here.

Let's look at the next violation. And the predecessor paragraph here talks about Savannah River implementing corrections to their job-specific bioassay monitoring.

And they go on to say, contrary to the above, processes to detect and prevent quality problems were not adequately established and implemented, and corrective actions did not prevent recurrence.

And that in November 1995, DOE identified to Westinghouse Savannah River that radiation work permitted prescribed bioassay sampling requirements were not effectively implemented in that 23 percent of the workers did

not submit bioassay samples as required.

So that means 77 percent did back in November 1995. So here's a different data point. It's not just that only data point in 1997.

We have that 77 percent submitted bioassay samples. But they were cautioned about it.

Corrective actions were implemented by Westinghouse Savannah River. However, the corrective actions were not effective to prevent recurrence in that non-participation by radiation workers in the job-specific portion of the program continued through 1996 and increased to a level of non-participation of 79 percent by the second quarter of 1997.

So, they were at 77 percent. Thirty-three percent in the first quarter of April 19 -- well, actually I've got this on the next slide. Instead of trying to talk about this.

So, there's three data points here. November of 1995 you've got 77 percent participation. April '97 you've got 33 percent participation. And July of 1997 you've got 21

percent participation.

And this is just the job-specific portion. The other thing that I would point out here is that your characterization in your report of a chronic history of wide non-compliance, November 1995 to July 1997 is the only time period we really have data to evaluate this is 26 months.

So, a little over two years.

MR. FITZGERALD: Well, I think we wanted to point out, some of these discrepancies are getting to be identified in the Tiger Team. In other words, in terms of the delinquency or what have you.

DR. TAULBEE: Those were different issues.

MR. FITZGERALD: But let me also ask you, I guess I'm not following the -- the emphasis on 830 versus 835.

I mean, yeah. I think I understand certainly the compliance context. But what are you trying to drive at?

DR. TAULBEE: Let me finish and we'll see. Okay?

MR. FITZGERALD: Okay.

DR. TAULBEE: All right. So now if we look at the NIOSH evaluation, the SC&A evaluation and these few data points. This is subcontractors with monitoring data.

The green is our report where we were showing between 60 and 80 percent subcontractors with monitoring data. Our reevaluation of the SC&A data using an annual criteria for the non-tritium shows that we're between 80 and 100 percent.

And then when you get to 1996, the Westinghouse one, this is if you assume, and this is a big assumption. Which I think Joe has already indicated that while subcontractors may make up a larger fraction of the job-specific bioassay, they are not --

(Simultaneous speaking.)

MR. FITZGERALD: -- necessarily exclusive.

DR. TAULBEE: Right. But if you did, then from even that standpoint in that November of 1995, it falls within that era.

Something happened there in '96 and '97 that the job-specific bioassay decreased as far as people complying with it. Which is why I believe they were fine, because there's a clear decrease that happened, where there wasn't management support.

And so my next slide here is talking more about the notice of violation of why was the violation 830 procedural and not the violation of 835. I really want to go through this as to why it wasn't 835 because it gives context to this whole monitoring scenario.

If people were not being properly monitored, that is a violation of 10 CFR 835. Monitoring in the workplace and individual monitoring.

These are the two parts of the regulation. 10 CFR 835.402 is individual monitoring requirements.

Monitoring of individuals. I'm going to go through the first one first. Monitoring of individuals in areas shall be performed to demonstrate compliance with regulations in this

part, document radiological conditions in the workplace, detect changes in radiological conditions, detect the gradual buildup of radioactive materials in the workplace, and verify the effectiveness of engineering and process controls containing radioactive material and reducing radiation exposure.

Part B of that is area monitoring in the workplace shall be routinely performed as necessary to identify and control potential sources of personnel exposure to radiation and radioactive material.

For individual monitoring, for the purpose of monitoring individual exposures to internal radiation, internal dose evaluation programs, including routine bioassay programs, shall be conducted for radiological workers who under typical conditions are likely to receive 0.1 rem or more committed effective dose equivalent, and/or five rem or more committed dose equivalent to any organ or tissue from all occupational radionuclide intakes in a year. And this gets to what Jim was talking about, of

externals and internals being separated.

Under DOE Standard 1128-98, Section 5.3.2, these are the monitoring requirements for selection of employees for bioassay programs.

Workers who are considered likely to have intakes resulting in excess of 100 millirem CEDE are required to participate in a bioassay program. However, because of the extensive radiological control practices for plutonium facilities, including a high degree of engineer barrier containment, no typical plutonium worker is likely to have intakes of 100 millirem CEDE or more.

However, this should not be used as an excuse to exclude workers from routine bioassay. Although no one should be considered likely to have intakes resulting in 100 millirem, some workers, not all, some workers are at a significantly higher risk for incurring an intake then others, and should be routinely monitored.

This is the standard today. This is how monitoring is done today. It was originated in June 1998, reaffirmed in May of 2003. And so

there have been small changes to this.

During the enforcement conference with DOE on July 28, Westinghouse described the purpose of their bioassay sampling program. They stated they had a formal no intake policy for radionuclides other then tritium.

And that along with its formalized workplace indicators program, including air sampling and contamination surveys, those were the primary means for determining whether a worker requires bioassay sampling outside of the routing bioassay program. For these cases, special bioassay sampling was performed.

The radiological control at SRS was a defense in depth. They had this zero intake policy, engineering controls, procedural controls, PPE, and surveillance.

And I'm going to focus here on the surveillance. Surveillance is used to verify effectiveness of the engineering controls, procedural controls, and the PPE.

There's air monitoring, the facility contamination surveys, their personal

contamination surveys, and a routine bioassay. The routine bioassay is used to check to verify -- used as a check to verify the effectiveness of the procedural and engineering controls, and to trigger for cause bioassay. So it's there as kind of the final check.

It's requested from workers who have a reasonable potential for intakes, but who SRS is confident did not have intakes in excess of two percent of the annual limit.

Westinghouse stated that the workers themselves were the last line of defense in the workplace indicator for which -- which was the reason why a confirmatory program at the site was conducted.

So, here's what the site thought was happening, this expected monitoring. They thought that workers signed in on the RWP.

And as I described earlier, they participate. If they participate in the routine sampling program for the radionuclides specified on the RWP, then they would submit under the routine schedule.

If they were not, they went under job-specific and RCO, or rad control, notes the requirement, issued a yellow label. Worker submits the sample, yes/no, if they didn't, they went into the delinquency tracking system.

That's what they thought was happening. The next slide is what was actually happening.

This is from their corrective action. So they went through and this is where they got to that 21 percent.

Okay. And here I've got the numbers from that April assessment, because that's the only hard numbers that we have without those facility -- or those Westinghouse analysis.

In April of 1997 the site looked at 3,200 samples. Thirty-two hundred RWPs. And 95 percent of those -- of people who signed in on those that required bioassay, were on routine programs. Ninety-five percent.

So, from that analysis, you can follow it going over. Okay.

Five percent were not on a routine

program and had to submit the job-specific bioassay. Now, the rad control office sometimes noted that there was a requirement, issued the tag, and the worker submitted the sample.

There were occasions where the rad control office didn't note that the sample was required. But the worker submitted a sample anyway.

A worker realized it, and submitted their samples. And so that was basically 1.65 percent of that five percent total.

This is when there is 33 percent compliance which dropped a little bit by the time you got to the second quarter of 1997. So what we're looking at is 3.35 percent were not sampled in that initial limited analysis, or 107 samples.

The full assessment that keeps getting bantered about here, is about 21 percent compliance. That's 21 percent compliance of what may be five percent, I'm actually not sure until we see those facility assessments, because the numbers don't quite match here. But, another point I want to bring up here is that 1997, the

total number of samples not received was 256. That's in the notice of violation.

That's the number of workers they went back and requested sampling for. Okay. Now -- and by the way, of those 256, no one had an intake.

But this is the split here. It's not an RWP-specific bioassay. It's a job-specific bioassay from an RWP that workers signed in on.

But if you've got 20 workers here signing in on this RWP, 19 of them from this 3,200 sample analysis, 19 of them are on a routine bioassay monitoring program and submitted samples. One of them goes down this other path.

Okay. If you look at the number of routine actinide samples from the Savannah River Site, and this is data presented to DOE during the notice of violation, the number of samples requested in 1996 and 1997, eight thousand, nine thousand samples requested.

These are routine actinide samples. So you've got a large number of samples being presented. The number of samples received is 99

and 96 percent.

The number that were initially positive, and these are false positives for the most part because of your monitoring methodology, you've got 79 that were initially positive in '96, and 105 in 1997. But the number of confirmed intakes are two in each of those years.

This is demonstrating they have very good radiological control of the facility. And that intakes are very rare. You're looking at less than .1 percent here.

And again, the internal dosimetrist who presented -- or provided this information indicated that bioassay was the final confirmation that the workplace controls were in fact working.

Now, are there lapses? Yes. You have two people here that got intakes. If you look at the job-specific samples, these are for 1997, which is the only data that we have provided. For this whole year there were approximately 1,500.

And this is the information provided

to DOE. The number of positive, zero. Number of confirmed intakes, zero.

In 1998 there's 564 job-specific actinide samples. No positive, no intakes.

If you add up the routine and the job-specific values from the past two tables, you get to 10,000 bioassay samples or actinides for non-routine. Or non-tritium samples.

Now that breakdown doesn't match with that 95 and 5. This one is 86 and 14. So if you take that same number of workers, of 20 that I used earlier, you've got 17 that are on routine. And three that are on job-specific.

Again, we need those facility evaluation reports to get into more detail in order to understand this data better. But the 256 workers that were initially missed, none of them had intakes when they did the follow-up.

So, we're looking at very good control of the rad environment. SRS also had a special actinide monitoring system.

And this -- these are samples taken for cause. This is where something went wrong.

They knew something went wrong.

They wanted -- the workplace indicators, something happened. And in 1996 they requested 134.

And so here the number of samples received is matching. Because if you've got an accident or incident, you're going to do a lot of follow up to make sure everybody leaves a sample.

And in this case, not everybody under these upset conditions gets an intake. In fact, 6.7 percent did.

And by the way, those two previous are included in here because of that -- those intakes, those positive bioassays would go back and trigger a special bioassay to find out what happened.

So again, the workplace surveillance indicators indicated something was wrong here. But you're still looking at a very low number of people that got intakes at this site in this time period.

So, we disagree with SC&A's conclusion that the notice of violation would prohibit dose

reconstruction of subcontractor construction trades workers. Job-specific bioassay in conjunction with the routine monitoring used for surveillance to confirm the adequacy of the workplace monitoring was used for surveillance to confirm the adequacy of the workplace controls.

Routine prescheduled bioassay monitoring was the primary method of surveillance as indicated by the large number of workers that are on the routine bioassay compared to the job-specific. The number of intakes at the site is very low. Less than 21 percent.

Now, in their notice of violation, in the conference, DOE acknowledged the rigorous radiological control program during the enforcement meeting. DOE said, DOE is aware that for all radionuclides other than tritium, Westinghouse internal dosimetry program does not knowingly permit any worker to be exposed to airborne radioactive material.

Further it is noted that WSRC has implemented a rigorous program for comprehensive use of field indicators during work activities to

signal that an unexpected radiological condition may have led to potential occupational intakes of radioactive material by a worker.

Furthermore, with the follow-up of the sampling of 256 workers conducted by the site, there is no missing bioassay in 1997. Regardless of the initial 66 percent non-participation rate under the limited assessment, or the 79 participation rate under the full assessment, there's no effect on the coworker model here.

For 1997, all the data was collected.

MR. FITZGERALD: Thank God for resampling.

DR. TAULBEE: Yes. But the site also evaluated the 1996. The site evaluated potential for those --

MR. FITZGERALD: I'm sorry.

DR. TAULBEE: -- who may be missing samples in 1996, and concluded that they didn't have a potential for intake.

Now, what exactly did they do? I don't know. I'd like to look at those assessments and find out.

To us, and this has changed a little bit from our discussion this morning where I stated SC&A has not demonstrated that subcontractors were primarily or only monitored via job-specific.

I think our discussion today, we recognize that this violation affected not just subcontractors, but construction trades and operations. Because an operations worker can be signing in on an RWP and not be on a routine monitoring for that radionuclide and have to leave a job-specific.

MR. FITZGERALD: Sure.

DR. TAULBEE: And I'd really like to know those numbers. Because I'm very curious if that's the dominant, from that standpoint of people who --

(Simultaneous speaking.)

MR. FITZGERALD: -- accurate representative source term on an RQB, too. Given the fact that some of these job-specifics are unique.

DR. TAULBEE: So, even if a larger

percentage of subcontractors used job-specific bioassay compared to WSRC employees, whether they are in-house construction trades or operations, a larger fraction of the subcontractor construction trades workers were monitored via routine bioassay, as we'll demonstrate in our next presentation.

But keep in mind here, from that -- the slide, and let me go back to it. For subcontractor RWP work, this would be page 32. This is the one with 3,200 samples, the actual subcontractor monitoring.

These are people signing in on an RWP. So for one, they have to be rad worker trained. Especially in this era.

10 CFR 835 requires our -- Rad Worker II. So they have to have a radiological qualification card.

When you complete Rad Worker II, you're issued one. And so everybody was trained from that standpoint. Everybody had one of these cards.

Now, subcontractors, even if they were

not, kind of a one-off job coming in to do whatever, they were signing in on this RWP. They had to have that card.

They had to have external monitoring. And they had to have the card in order to be on this.

Of a work crew of 20, again, I'll use the lower numbers of 84, or of 85 percent and 15 percent if you want. Seventeen of them were on a routine schedule, okay, for bioassay.

A few were not under the job-specific. Those that were not, there was a follow-up to make sure that they left their samples.

And that was why they were fined. They were not following the procedure here, and you had some people that should have been monitored by the RWP that were not.

But from a coworker standpoint, when you have 85 or 90 percent of the people working on that same job being monitored, I believe we can take that coworker data and apply it to these unmonitored workers.

Now in 1997 it's not an issue. We got

all of the samples. '96 they said they didn't have a potential for 100 millirem.

CHAIR CLAWSON: Wait a minute. One -- in '97 you got 100 percent you said.

DR. TAULBEE: Yes.

CHAIR CLAWSON: For one quarter.

DR. TAULBEE: No. The whole year.

MR. FITZGERALD: For the year. They resampled.

CHAIR CLAWSON: For the year.

DR. TAULBEE: They went back and resampled everybody that did not submit a sample down here. These 107 samples from the third -- or from the first quarter, they went back and they got everybody, to make sure --

MR. FITZGERALD: It was the entire year, another sample.

DR. TAULBEE: So, for '97 there is no missing data whatsoever. If there -- because they thought this was the process prior to '95 as well, through the '90s, then there could be missing samples from these earlier assessments. We don't know yet.

We know in November of 1995 that DOE identified, what was it, 23 percent had not submitted samples in November of 1995. But 77 percent had.

And that's just the job-specifics.

MR. FITZGERALD: Well, we don't -- I'm not sure we know for the year or what the scope of that '95, do we?

DR. TAULBEE: Fair enough. Fair enough.

MR. FITZGERALD: And I think that -- yeah, I think the sample, given our personal experience, the sample is everything.

Because if you don't have a good sample, your percentage is almost irrelevant.

DR. TAULBEE: Again, that's just the job-specific component.

MR. FITZGERALD: Right.

DR. TAULBEE: And so what we're showing here that the bulk of it is actual routine monitoring from the rad qual card.

MR. FITZGERALD: Yeah.

DR. TAULBEE: Okay. So, I just want

to make sure that that's clear.

Let's see. So, the implications from dose reconstruction under EEOICPA. And this is my last slide, Slide 40. There's no evidence of a workplace exposure nor an indication that there was a missed intake of radionuclides at Savannah River.

Significant workplace and individual monitoring information through the surveillance, including over 10,000 bioassay samples in 1997, to support that there was no internal dose that went undetected. Therefore, we conclude dose reconstruction is feasible and sufficiently accurate through the use of the coworker model.

MR. FITZGERALD: Okay --

(Simultaneous speaking.)

MR. FITZGERALD: Right, right, right. Okay. You probably know there's -- it's a comeback to some extent on this.

I feel like I'm in sort of DOE's position saying that yes, okay. I hear the strength of the program.

And the fact that it was conforming

with 835 in terms of assuring that there was no likelihood of 100 millirem being experienced by workers.

And that there's a special bioassay program, if there was any evidence of that. But, my concern is to take this from the health physics, excuse me, the health physics context or the radiological control context, or the compliance context, and just put it in the dose reconstruction context. Because I -- yes, you know, they did do some good monitoring, there were improvements in the '90s. We could go into this in a lot of detail. And I saw the same, certainly the same discussion in the compliance conference.

And I understand exactly where Westinghouse is coming from. You know, they were taking justifiable pride in the fact that they had implemented a pretty stringent program.

But the obvious question was, you have these missing job-specific bioassays, and since the whole purpose of the retrospective program was to verify that you had no failures, whether

it's engineering failures, or personnel failures, or equipment failures, or whatever, you know, how would you in fact be able to characterize, or how would you in fact be able to know what intakes took place?

Particularly for workers that may not be available for a subsequent bioassay. And yes, that was the procedural basis for the citation.

But quite apart from that, from the dose reconstruction standpoint I went back to Jim's criteria. And walking through that point by point.

If we have missing data, and you know, having been at this now for a while, I'm sort of less tied to whether it's 60 percent, 70 percent, 80 percent, 20 percent, 25 percent. You know, there is some degree of missing data.

You know, and I don't know what the early '90s will show. That's going to be kind of interesting to see.

But there's missing data. And all I am interested in is the dose reconstruction context of how would that, you know, that missing

data be addressed in terms of the coworker guidelines, since that's kind of where we're at, you know, if we're going to certainly develop a coworker model.

And we've spent a lot of time defining criteria. Even though they're qualitative criteria, I think they're good criteria for judging completeness of a data set that would be in fact relied upon for coworker model development.

And all I'm saying is, you know, I -- you know, I feel like I was taking a chance walking through that criteria knowing Jim would be here.

But I walked through that saying okay, as a logic exercise, we have missing data in terms of job-specific bioassays for a group of workers. And I think Stu actually put the -- was the one that came up with the question.

MR. HINNEFELD: I asked the question on the --

MR. FITZGERALD: It occurred to me at the time that we had gotten so much into

subcontractors that almost by rote, you know, we're using the term subcontractor.

But no, these were actually the workers that were being given job-specific bioassays. They could be any mix.

And that mix will change year to year. So, but nonetheless, if that's the -- if that's the coworker, you know, coworker model that we're trying to get to, I'd say stick to the dose reconstruction context.

And walk it down. That's why I kind of suggested we put this at the -- as the end point.

And use what we've spent a great deal of time coming up with as the framework for making that kind of a decision whether you have sufficient data. Because I think that's kind of what we're saying.

You know, quite apart from all the Sturm und Drang of the violation, this and that, it's really coming down to you have a question of completeness, and how would you adjudicate that question of incompleteness given the available

data?

And I know you've already touched on it here and there. But, I, you know, without getting into sort of all the ins and outs of 830 or 835 and all the rest of it, it really comes down to that.

I think, and this would probably be after lunch. I would suggest we just go through and walk that down and see where we may be apart. And where we may agree.

But then decide which way it points. I mean, I think again, a great deal of thought went into, you know, how would we figure these things out?

And I'd just as soon use the tool we have available and see how it works. This one has a lot of bells and whistles just because of the history and the fact that we have a program that had no obvious intake but has a question of completeness in one segment.

So that's all I'm coming from.

DR. TAULBEE: Well, let me address that last point there of completeness in one

segment. Because if you look at one of the criterion, and Jim has dropped the coworker line, is that the workers need to be performing the same work.

The actual quote that you have in your slide there is --

MR. FITZGERALD: Right.

DR. TAULBEE: Similar work or, you know, that a coworker model would apply to it. If you go back to the slide with the actual subcontractor monitoring here, they're doing the same work on the RWP.

The sampling was, if they had it on their qual card, then they were routinely monitored. And so their monitoring was for that same RWP.

The job-specific ones that are missing, are on that same RWP. So the people who were monitored should apply to those ones that are not -- that we don't have the samples, that are incomplete.

MR. FITZGERALD: Yes, I think the big if I would throw there is that, if in fact the

source terms associated with the specific jobs that a lot of these workers were being assigned to under the RWP were in fact being reflected properly.

And I don't think they were consistently. And I think that's part of what I want to get into when we walk this thing through, that, you know, where do we stand on that particular question.

And whether or not you even have an appropriate set of monitoring data for these workers. I mean, quite apart from the RQB, I mean I think the point was made that the RQB wasn't appropriate.

DR. TAULBEE: How would that be not an 835 violation then if they weren't monitored for the right radionuclides in the workplace and they were exposed to them?

MR. FITZGERALD: Well, actually --

DR. TAULBEE: I mean, --

MR. FITZGERALD: Actually it was a self -- it wasn't brought up in the NOV in terms of DOE review. It was raised by Westinghouse on

its own in terms of the enforcement stand out.

It was sort of a 120 day no fault, we're not going to cite you if you find it yourself. And as in this case, Westinghouse found it itself.

And I think --

DR. TAULBEE: In one facility.

MR. FITZGERALD: And it was no fault meaning that, you know, typically under Price-Anderson you had to self-report any findings of noncompliance.

In this particular case it was 120 days during which you could, using this guide of 31 deficiencies, identify issues that would not be subject to necessary enforcement.

So I think that was raised then. And I can show you the memos. But it was raised then as a real concern.

And I think that's the implication in -- and it's not, you know, it's not something that's a side bar because it's inherent to the way RWPs were filled for job-specific bioassays.

DR. TAULBEE: Again, under the

surveillance program, on a routine bioassay, particularly you're pointing out the americium-241.

MR. FITZGERALD: Right.

DR. TAULBEE: Which is caught on a chest count by the way, that would be found from that standpoint as well. And so I mean, you're -- yes there are -- I mean, all the programs would have an individual facility here and there where they might have a --

MR. FITZGERALD: This is systemic. I'm talking a systemic issue. This is not here and there.

DR. TAULBEE: I'm not saying --

MR. FITZGERALD: This was a --

DR. TAULBEE: We'll go through the documents again.

(Simultaneous speaking.)

MR. FITZGERALD: We'll go through the -- we'll go through the program findings and the corrective actions that took place.

But issue where you have a system that was applying a routine bioassay framework to job-

specific bioassays, and where you have an issue where no one was actually doing characterization of D&D work, of waste management work, of specialized work that in fact had source terms that would not be reflected, I think that's something that has to be addressed.

DR. NETON: I think -- I'd just like to say one thing maybe before we break. Maybe a comment and an observation. Or a question and observation.

It seems to me that it's pretty clear that Westinghouse relied on a routine bioassay program for monitoring doses.

MR. FITZGERALD: Right.

DR. NETON: Now the fact that these -- there were a number of missing job-specifics, I don't think would be any different if let's say they didn't rely on job-specific and they required 100 percent routine monitoring and five percent of the workers didn't do their routine, would that make it any different?

I mean, it's the same kind of thing. We've got five percent missing samples from

workers, okay. You know, it's not really that different.

MR. FITZGERALD: But I think -- I think when we're talking job-specific, and this is not a routine or typical work environment --

DR. NETON: But they relied -- but you have to -- they relied on a routine monitoring program to -- we could talk about that as a practice.

MR. FITZGERALD: Right.

DR. NETON: As a practice.

MR. FITZGERALD: Right.

DR. NETON: Because what it results in is that we are wedded to a chronic exposure model that we've used for all other sites to do a dose reconstruction coworker model for these workers. And you could argue, maybe that's the point where this discussion needs to go.

MR. FITZGERALD: Right.

DR. NETON: And this is addressed in the imp guide to some extent.

MR. FITZGERALD: Right.

DR. NETON: Is it appropriate to take

a chronic exposure model using routine bioassay and assess dose to workers who are intermittently exposed to some degree? Or unknowingly --

MR. FITZGERALD: Unknowingly intermittently exposed to maybe some unknown source --

DR. NETON: Well, that's a different -- the source term is a different issue. But what I'm saying now is, is there a series of -- is the chronic exposure model that we apply plausibly bound -- does it plausibly bound those potentially intermittently exposed workers or --

MR. FITZGERALD: That's kind of where I've been -- I've been anxious to get to the imp guide just because I think that's kind of the crux issue.

DR. NETON: Yeah.

MR. FITZGERALD: And the core to this is can you in fact apply the routine or that --

DR. NETON: Well, see, to me --

MR. FITZGERALD: Routine sampling to something like this?

DR. NETON: Ninety-five percent of the

workers left their routine samples. Okay. That's fine, you know.

Okay, there's five percent missing here, or potentially missing. But that's a pretty good compliance rate.

And if you already -- if we can agree, and I don't know if we will or not, that the routine monitoring samples are the ones that are going to drive the coworker model, then these missing job-specific samples get lost in the wash. I mean, they're like a non-compliance, true.

MR. FITZGERALD: Right. But whether those workers in fact would be --

DR. NETON: But they would receive a chronic exposure model.

MR. FITZGERALD: -- be bound by the chronic exposure model --

DR. NETON: Exactly.

MR. FITZGERALD: -- of the 95 percent of the other workers.

DR. NETON: That's the crux of the whole thing.

MR. FITZGERALD: And that's the crux of the issue, but that also gets down to, I think a lot of the earlier debates we've had on sort of the subcontractors who come and go on site. And whether or not they've had these hazardous duties and whether they were exposed differently.

And it gets into a lot of that.

DR. NETON: But then what I'm seeing is, Tim is reporting that there were virtually no positive samples in this era. The 99th percentile is --

MR. FITZGERALD: Of the routine.

DR. NETON: Yes.

MR. FITZGERALD: And I think the dilemma I have is the same dilemma I think DOE was facing when they were given the same arguments that however, you know, and then they came up with one example.

DR. NETON: Yeah.

MR. FITZGERALD: But you know, however, you know, what happens if you have transient workers who you're not going to capture, and how can you know what you don't know?

DR. NETON: Well, I can't sense that there's some magic exposure potential for these job-specific people versus the 95 percent routine. I mean, I just --

MR. FITZGERALD: Well, I'm going to talk about that after lunch.

DR. NETON: Okay.

MR. FITZGERALD: Because we touched on that. But I think you just can't write them off as being part and parcel to the routines.

I think the subs that were brought in and we had one example where they were brought in to do the higher exposure jobs, the safe exposure.

DR. NETON: Yes.

MR. FITZGERALD: And I think there's other questions where in fact they were brought in to do waste management. They were brought in to do D&D.

When you bring a subcontractor into a job-specific environment doing D&D, I think you're dealing with a spectrum of source terms which are unlike the typical work.

DR. NETON: Yes.

MR. FITZGERALD: You're not, you know, comparing those two would be different. So I think that's the caution I would have that -- and I kind of like the words in the end guide, free advertisement there.

Where you're actually looking at, you know, how representative is this group to this group? And, you know, what's the substantiation of that before we go much further, that kind of thing.

DR. NETON: Well, and really to put the issue to rest to some degree, we do need to know the distribution of the workers that didn't leave the job-specifics.

Because if it turns out it's mostly DuPont people or mostly subcontractors, it makes a difference, I think, in the interpretation.

DR. TAULBEE: Well, I think we can somewhat address that in the next presentation of the subcontractors by just looking at the monitoring.

DR. NETON: Yeah.

DR. TAULBEE: You know, what monitoring data is available.

DR. NETON: Well, I do think we need to agree that a chronic exposure model can be applied to these workers at some point. I mean, that's -- because that's what we're going to do.

I mean, we -- right. We are not going to do job-specific. We don't have the data to do job-specific.

(Simultaneous speaking.)

DR. NETON: -- RWP-specific, it's not going to happen.

MR. FITZGERALD: Right. And that is a key issue. Can you take the routine sampling, which is the vast majority.

You have lots of samples at Savannah River. Can you in fact apply this to this group or not?

And is the -- and I think the words you used is the relationship to the exposure, and the rest of that, is that similar enough that one can make that argument?

DR. NETON: Right. But if you have

no exposures recorded, then you've got to worry. And you've got to think, well, I don't know what this really means.

And remember, there were zero positive job-specific bioassay samples that were taken. Zero.

MR. FITZGERALD: I'm sorry --

DR. NETON: -- all the bioassay jobs, all the job-specific bioassay samples that were taken in 1997 were zero.

MR. FITZGERALD: You mean resampling for that year.

DR. NETON: No, no. No, all the ones that they got, the 1,500 that they had --

MR. FITZGERALD: For '97.

DR. NETON: Had zero positives. That's an important point. Not the resample. The resamples were zero, but also the ones that they actually took from people that left job-specific, were zero.

There was not one positive detected in that whole group in that year.

MR. FITZGERALD: And that's aside from

the other question, which I won't badger, which is the question of whether or not the source terms are correct. But, beyond that --

DR. NETON: No. But I'm just saying, --

MR. FITZGERALD: Beyond that.

DR. NETON: Just let's deal with the facts as they are. You have 1,500 people that --

MR. FITZGERALD: Right.

DR. NETON: Bioassayed job-specific samples in '97. And not one detected positive.

MR. FITZGERALD: Right. And we don't yet know about '96, '95, '94, '93, and '92. But, we will have some more data hopefully.

CHAIR CLAWSON: Okay. Boy, I bet you guys are tired of listening to me talk.

(Laughter.)

CHAIR CLAWSON: So, with that being said, let's break for lunch.

MR. KATZ: Okay. So, I don't know for the folks in the room, before we break, this -- about timing, an hour may do it.

But, the folks told us earlier that came in from the hotel that they're pretty jammed up. So, it may not be that quick.

So I don't know whether -- is an hour enough?

CHAIR CLAWSON: That's fine.

MR. KATZ: You want to say an hour? But I don't want the people on the phone sitting here for 20 minutes waiting for you people to show up.

MR. FITZGERALD: Yes, the buffet might be. But, you know, if you only have what we saw last night, I would agree, it's going to be tough.

MR. KATZ: Yeah. That's what I'm saying.

MR. FITZGERALD: And that's a big -- usually they don't a --

MR. KATZ: And they don't -- and they don't have the -- well, they used to, but the place has shrunk. If you take a look at the new format, it's a different place to eat.

MR. FITZGERALD: Yeah.

MR. KATZ: So they don't have -- I

don't know how that works. But anyway, what do you want to say? Do you want to --

CHAIR CLAWSON: Let's say an hour. And go --

MR. KATZ: Okay.

CHAIR CLAWSON: And we can go from there.

MR. HINNEFELD: Or we say an hour and five minutes, that makes it a nice even 1:15.

MR. KATZ: Okay. An hour and 15 minutes. Okay.

MR. HINNEFELD: No, an hour and five minutes. So we start at 1:15.

CHAIR CLAWSON: We start at 1:15.

MR. KATZ: Okay. 1:15, folks on the phone. Thanks.

(Whereupon, the above-entitled matter went off the record at 12:09 p.m. and resumed at 1:16 p.m.)

CHAIRMAN CLAWSON: Okay, that being said, before we stopped here, I believe it was handed back off to Tim, if I'm not mistaken.

DR. TAULBEE: We've got subcontractor

internal monitoring data in NOCTS.

All right, so one of the issues here is the incomplete subcontractor data for coworker.

And I bring up that conclusion again, the SC&A concludes the bioassay data set for construction trades-worker subcontractors specifically, and CTWs generally, is demonstrably incomplete from 1989 to 1998, and likely before that time period, and does not satisfy the criteria set forth in the NIOSH draft criteria for evaluation and use of coworker data sets.

And this is where the job-specific bioassay and the routine bioassay, we had that discussion just before lunch.

But if the above statement is true, there should be significant incomplete data within the current claimant population.

And so since the report came out, we went back to the NOCTS claimant data set and we queried NOCTS to identify workers with construction trade titles, job titles, between 1991 and 1997 to try and fill in some of this

time period.

And this is assuming that we talked about -- well, not so much OTIB-75 -- but this is assuming that the NOCTS data set is a random sample of all workers.

These are people who have disease who have filed claims.

MR. FITZGERALD: Now, I'm sorry, is a subcontractor -- given the discussion earlier, has that been tested as a random sample?

DR. TAULBEE: No, we have not tested it from that standpoint.

MR. FITZGERALD: I know the other categories have been looked at.

DR. TAULBEE: Yes, it can be.

MR. FITZGERALD: It can be?

DR. TAULBEE: It can be, but we didn't and we haven't in this case.

What we did is we queried and we identified 412 claimants between 1991 and 1997. We reviewed each claim and determined whether they were a subcontractor or a prime.

And so we removed all the Westinghouse

Savannah River construction trades work to leave the formerly DuPont construction trades work.

So, we've just again dealing with the subcontractor population that we've been discussing all day.

So, these are the people that are transient, these are the people that are coming in and leaving, coming back, leaving, et cetera.

So, we removed all the electricians, millwrights, mechanics that were Westinghouse Savannah River Corporation.

We kept all the Bechtel because they were the subcontractor for construction trades workers, and that was the people that Joe had also singled out as you guys did your RWPs and when you were identifying whether this was a subcontractor or not, if they were Bechtel, you were categorizing them as subcontractor.

One of the interesting things in here is we started removing crane operators and riggers, and I'm like what's going on here? Well, you think about the canyons, there are canyon crane-operators and canyon riggers who were

Westinghouse operations people effectively.

So, they're not included here. We just did subcontractors. These are people moving in and out.

We do have crane operators in this group, they're under the heavy equipment tag of Bechtel --

MEMBER LOCKEY: Can I ask you the question of what was it like to work with the subcontractors?

DR. TAULBEE: If they worked at all, we included them. If we have any verified employment at Savannah River Site for the subcontractors in this time period of '91 to '97.

MEMBER LOCKEY: So, do you know what that spread is?

DR. TAULBEE: No, but we can calculate that, and you'll see that from some of the slides here that it varies.

Some people were only there for a few months, some people a year. Others were there that entire span, or we had monitoring data for that entire span.

MEMBER LOCKEY: Okay.

CHAIRMAN CLAWSON: How did you separate, what was the criteria to be able to separate them?

Because I'm trying to put my hands around how you did that with construction with trades being on both sides, how they were separated out. What do you use?

DR. TAULBEE: We used their employer, whether they were a Westinghouse Savannah River Corporation employee, or whether they were Bechtel or other, MK Ferguson or some other subcontractor.

CHAIRMAN CLAWSON: So, you were using the subcontractor?

DR. TAULBEE: That's right.

Basically, what we separated out was the Westinghouse Savannah River people from this population and left everybody else.

CHAIRMAN CLAWSON: Okay.

DR. TAULBEE: So, we identified 371 claimants who were subcontractors, CTWs, between 1991 and 1997.

Oh, I'm sorry, I'll refer to the slides here for those of you that have them. I'm on Page 2, or 3, I'm sorry. Yes, Page 3.

All right, what we found is that 340 of the 371 subcontractors have some form of internal monitoring.

They either have the non-tritium bioassay or an actinide bioassay, a tritium bioassay, or they have a whole-body count, an in-vivo bioassay.

During their work at Savannah River between '91 and '97, there were only 31 subcontractors in NOCTS that have no internal monitoring data.

Now, our premise here is that we believe monitoring data from the 340 monitored workers can be used to bound the dose to the 31 unmonitored workers.

These are hard numbers; these are what we're looking at, what's in NOCTS and what isn't, who was monitored and who wasn't.

The distribution by craft, next slide, you'll see that the bulk of them are again

electricians, pipe-fitters, and carpenters.

This is just like the report that we presented to the Board in August. When we showed the distribution; it's the same top three.

The other category was larger in the -- or construction general was larger in the previous report.

Here, we have a little more specificity amongst them, and so we find that the laborers, welders, heavy equipment, iron workers, drivers and slaters, painters, boiler-makers, sheet metals, millwrights.

And the other category here is very small.

So, we were able to categorize virtually all of them as to what their occupations were by craft for this group. And like I said, that's the same relative proportions.

So, the previous one, Figure 4-2, in our other report, was a true random sample.

We took all the job plans and randomly selected them, and used the help of a

statistician to randomly select those job plans and looked at those trades.

Here we have a much larger population in Figure 4-2, where there's 88 people in this larger one here. We have 371. So, you can see that we're looking at two random samples, really.

So, we evaluated this on a per-year basis, and the total number of workers, 1991, there's 348, 284, 250.

It goes down, as you see, by year because we're getting more into modern time periods. And work was actually kind of decreasing in that time period.

External monitoring, I'm looking at 1991, 321 of the 348 had external monitoring; 27 did not.

In this time period, especially the '96 and '97 time period, if you do not have external monitoring, you do not have the potential for an internal exposure at the site.

Because you would have external monitoring from the rad standpoint.

Now, in the earlier years, I believe

that could also be true because they were following 54, 84, and 11, and then the RadCon manual in 1992.

So, no external is a clear indicator to me that they don't have the potential for an internal.

For the non-tritium bioassay, we had 205, 1991, and you can see it going down, and then the tritium, you can see those numbers, whole-body count. And then they were externally monitored but no internal monitoring data.

You can see on a per-year basis, we're looking at a pretty small population, 13, 6, 5, 7, 8, 5, 7, going down in time. These are people who wore a badge but had no internal monitoring whatsoever.

If you look at this data from the standpoint of just the externally-monitored individuals, and calculate ratios based upon that, there were 1991, 321 externally monitored, 205 had non-tritium urine bioassay, 57 did not have the non-tritium bioassay, but had a tritium bioassay and/or a whole-body count.

So, this is a progressive list going down. It doesn't mean that there are just 57 that had tritium bioassay.

We used a hierarchy here, that there's a large number of people that have -- the top criteria for us was looking at the non-tritium bioassay or the actinide bioassay as being the most critical.

And if they didn't have that, did they have any tritium monitoring? Yes. Some people who worked at the reactors would only have tritium bioassay as well as a whole-body count.

Forty-six of them just had a whole-body count. So, the percentage that was internally monitored, or the number, comes out to 308. That's 95.9 percent of subcontractor construction trades workers in NOCTS have internal monitoring.

The numbers vary a little bit from 97.8 down to 92.1 in 1997. If you look at just the in-vitro bioassay monitoring, the numbers are lower.

This is just if they had a urine

sample -- either a non-tritium sample or a tritium sample.

Using the same external monitoring numbers, urine numbers come down to around 81, 84 percent, then they begin to drop off: 93, 94, 95, 96, 97.

How does this compare to the previous slide that I showed you with the -- next slide -- the percentage monitored, the November 1995 internal assessment of the job-specific bioassay, or at least what we think was the job-specific, and how does this data compare with that?

And the hashtags are the urine only, which falls right in line. If you consider all monitoring, that's the green bars up behind. That's with the whole-body counts included, and you can see this workforce is quite well monitored.

I drew a line here, next slide, for 10 CFR 835 era. That's where the difference is. That's where it became mandatory to monitor everybody for the potential for exposure greater than 100 millirem.

So, some of the extrapolation going backwards doesn't seem to hold here, and it seems to be actually worse in '96 and '97 than what you had in earlier years, based upon what we see in NOCTS.

Now, the next slide, before I show some drafts that people can follow here, is details of NOCTS internal monitoring data. I'm trying to explain a spreadsheet here.

You'll see on Slide 1, which will indicate non-tritium bioassay, H3 for tritium bioassay, WB for whole-body count. And again, this is a hierarchy.

And then the red would be no internal monitoring; no extern means no external; and blank red would mean external monitoring but no internal monitoring, and that's the critical group that we would be applying the coworker model to.

So, going to the next slide, here's a snapshot of the spreadsheet that we've got, and I've provided the whole thing in a PDF, released out on the Advisory Board's website, under the

SEC Work Group in this particular meeting.

And I want to walk you through this, because if you look at the first claim that's up there, this is an individual who worked at the site in '91, '92, '93, he has no external monitoring and no internal monitoring.

No external monitoring in this time period could make a case that they had no potential for internal exposures.

If you look at the next individual, and again, I'm an electrician, you'll see the green of the one: '91, '92, '93, '94, '95.

And the one just is simply countering. It's easier for us to work with that in a spreadsheet, but that means that they had a non-tritium bioassay, at least one, in each of those years.

And many of them -- and I'll get to that in a minute -- have many more samples than just one in a particular year.

The next one is a painter who has '91, '92, '93, has non-tritium bioassay. He might also have tritium bioassay as well as whole-body

count.

Ninety-four, he doesn't have non-tritium bioassay, but does have tritium bioassay in '94 and '95. He might also have whole-body count. Ninety-six, he has another non-tritium bioassay; in '97, tritium bioassay.

Next one, well, actually, let me jump down here to the laborer who has two non-tritium bioassay, three whole-body counts, and then in the last two years, we were informed that there was no external monitoring, meaning he couldn't go into an area.

The next one down, this would be a heavy-equipment operator, has external monitoring in '91, '92, '93, but no internal monitoring, and then no external monitoring in '94.

This is the type of person we would be applying the coworker model to. This would be somebody who's monitored for external, no internal monitoring.

Next one down is an electrician who has monitoring in '91; that was the only year of

employment.

The white spaces, by the way, means they were not on site, according to the Department of Labor's verified employment.

If you look at -- I want to jump down to the painter with the last two digits ending 60. This would be 1, 2, 3, 4, 5 up from the bottom.

You see that they were monitored from non-tritium bioassay in '91, '92, whole-body count in 1993, were not on site in '94 and '95, came back on site in '96, but were not monitored for external radiation, meaning they probably didn't go into an area that required monitoring.

So, what I want to show you here is we have a PDF, and now I'm going to switch out of this one --

MR. FITZGERALD: Before you leave that, are these a mix of job-specific and routine sampling?

DR. TAULBEE: Yes.

MR. FITZGERALD: Is it apparent from the data set?

DR. TAULBEE: From the data set, most are listed as routine monitoring, however, not all of them are.

There's times when there's others you can see with people that were involved in an incident, because they will be special.

So, the 8 hours and 24 hours, you'll see that intermixed.

MR. FITZGERALD: I'm just looking at the number of years involved, and in most cases, it looks like it's routine, but there's a couple cases where, obviously, it's one year and it could be routine within the year or maybe just one job sample.

DR. TAULBEE: And some of these are actually -- like one of the electricians or the one with the one year.

It very well could be a termination. That was their last one and the bioassay sample that we get --

MR. FITZGERALD: Right, so it's a variety.

DR. TAULBEE: So, it's a variety, it's

a variety. It was did they have a sample in that year?

MR. FITZGERALD: Right.

DR. TAULBEE: That was all we looked at.

MR. FITZGERALD: Okay, now let me stop presenting this and load another sheet to show you this.

MR. BARTON: If I could make a quick comment here? This is Bob Barton.

So, to your question, and, Tim, you can correct me if I'm wrong, but my experience is there's no way to tell from the records whether it was routine or job-specific.

You mentioned that some of the special samples because they were involved in some form of incident, but to my knowledge, there's no way to delineate which is either routine versus job-specific.

DR. TAULBEE: That is true but you can see some of them that were not necessarily for special, you would actually list other, and those, I think, are some job-specifics mixed in

there.

It wasn't a special sample but it wasn't listed as routine either. So, it depends upon within the claim.

Can you all see this particular sheet of per-unit? Okay, good. All right, so this is all of the claimants.

This is all 370, and these are sorted by claim ID and I just want to try and page-down through here, and you'll see that there are some time periods here, like on the first page, where there's no monitoring but there's also no external monitoring.

And as we go down to the next page, you'll see the intermittentness, but most of the red indicate that there's no external monitoring as well.

Because if you look on Page 2, well, you can't see this, can you? I've got to move over next to Dr. Lockey. Sorry.

Okay, so this is all 360 claimants, scrolling back up here to the top. And you'll see that there's no external in different spots.

Again you've got individuals that have no monitoring whatsoever; these are the people that we would apply.

If you look at the sheet-metal worker, the last, I guess about three-quarters of the way down the page, actually I think I can point to it. Can everybody see the pointer?

Okay, here's an individual that has no monitoring data in 1991, however, he has monitoring data in '92, '93, '94, '95, and '96.

We can estimate his dose, especially with non-tritium components, from that standpoint, even though he doesn't have any monitoring data. So, we wouldn't even need a coworker necessarily for that individual.

Down here with this particular pipe-fitter here, this would be a year we would need monitoring data.

The second, '92, we have non-tritium bioassay as whole-body count in '93 and '94. No monitoring in '95 but he has whole-body counts in '96 and '97.

So, like I said, we went through this

entire grouping, 371 individuals, and as you can see, it's kind of randomly distributed who was monitored and who wasn't within this entire population.

We then took the same group and sorted by craft and trade to see is there any craft or trade that is under-represented. And so this is what we have here.

So, all the boiler-makers up at the top and you got the carpenters. Again, there's a few that don't have any monitoring, one in particular has no external monitoring either.

You've got the drivers, concrete, the electricians, which were the bulk of the whole population, heavy equipment.

Again, who is not monitored appears to be kind of randomly distributed.

Insulators, iron workers, laborers. I see some laborers; there's quite a bit of red down here at the bottom, but there's also that they weren't externally monitored either, meaning no potential.

Machinists, millwrights, painters,

pipe-fitters, sheet metal workers, welders.

So, from this, you can see that the population that we have in NOCTS is a good representation of all the traps and trades.

Those that are missing for a particular year, we believe that the other workers in that year can be used to estimate what their dose is, or estimate what their intake is.

I'll go back to the presentation now.

So, the PDF of all 371 subcontractor construction trades workers indicates that the lack of monitoring appears to be randomly distributed and fairly sparse, and the breakdown by craft, it didn't appear, or it didn't show that there was any particular craft that was affected in this way.

And from the in-vitro bioassay sorted by claim, there are over 400 pages of subcontractor bioassay data in NOCTS. And I provided a PDF for the Work Group to look at.

It's on the web, and there's multiple analyses per worker. It might be easier, though, to actually let people page through this.

I printed them out as well and I'll show the PDF here, but we'll start with this and then I'll pass it down to Brad.

Let me pull this up. This might take a little while because it's fairly large, it's 25 megabytes.

But what you can see is that we're not looking at, for many of these subcontractors, a single sample a year.

We're looking at multiple samples in a year, and I'll just go through the first couple, just to try and illustrate the point here that I'm trying to make.

Take this first individual right here, and here you can see all of the routine monitoring.

If you look at his 1991 data -- can you guys see that up on the screen? Okay.

1991, he was routinely monitored for strontium and enriched uranium. So, his bioassay qualification card, just from looking at this data, would be Sr-01 and EU-01.

1992, you've got strontium-90, you've

got two strontium-90s and they are about six months apart again.

So, that would be a change from being monitored once a year to twice a year.

Plutonium was the same way. In this particular case, it would be monitored for once a year. Enriched uranium would be monitored once per year.

So, this is one individual here that I've got on this first page, this is the same individual. By the way, this is a carpenter.

We've got his claim ID in the upper-right corner as well as his craft, and then you can see here in 1996, there's some americium sampling, californium, curium, strontium-90.

Ninety-seven, you've got more americium, curium, californium, strontium-90, plutonium. Uranium in 1997. More americium, curium, and californium in '97, '98.

So, that's the first claim that we looked at. Going on to the next one, you'll see this individual doesn't have quite as much monitoring.

But again, there's more than just one sample per year or one analysis. And you can go through all the 483 pages of this if you want.

Once you get to above Claim 30,000, the Site changed their reporting methodology to us; this was around 2005, 2006. So, the printouts become a little different.

These are just the non-tritium bioassays. The latter years you'll see the tritium intermixed with it. So, the claim size files become bigger from that standpoint.

But my point here is that there is a lot of data in NOCTS for this population, and very few workers that are not monitored for which this data, we would apply it to.

So, again, SC&A concluded that the data set subcontractors specifically was incomplete between this time period.

We again disagree. We feel that the NOCTS data indicates that subcontractors were quite well monitored.

When evaluated on a global scale, over 90 percent of the subcontractors have some

internal monitoring data, in vivo or in vitro, over this time period.

Individual data can be used to estimate personal dose for missing data from previous years without needing a coworker model for some analytes, specifically for plutonium.

If they're monitoring in subsequent years and they're not showing anything positive, it's bounded as to what the initial was.

For those with no internal monitoring data, NIOSH believes that the monitoring data from the 340 internally monitored subcontractor construction trades workers can be used to bound the dose to the 31 unmonitored subcontractor construction trades workers that we currently have.

MR. FITZGERALD: Did you plan to look at the stratification? I mean, I raised that a little earlier.

Is that something that's in the works, or would be something incumbent if this were to go forward?

DR. TAULBEE: Stratification as in?

MR. FITZGERALD: As in the validity of the coworker carve-out.

DR. TAULBEE: It can be done. The biggest issue that we have, we have the HPRED database. So, we have all the Site's bioassay data since 1989, we have it all.

The issue is that it's sorted by Social Security number. With NOCTS, we can identify who was a subcontractor and who wasn't.

Within that data set, what we need is the key to access the full data set to pull out all of the others that are not NOCTS claimants. The Site has such a database and used it, I did too, when we were down there.

We'd go over and we couldn't tell whether this was a subcontractor or not, and they'd pull it up, I don't know if it was a security database or what, but they could tell which contracts --

MR. FITZGERALD: If the contracts were --

(Simultaneous Speaking.)

DR. TAULBEE: Right, but the reason

I'm raising it is to me that would be really the only other question about applying NOCTS, is the data set choices I don't know if the correct word is limited.

But certainly that question that you've raised in other venues on this particular issue with subcontractors, particularly given the questions that have arisen in that category of workers, about whether that would come out valid or not, clearly, it's a labor-intensive thing.

So, it's not something -- it's unlikely but that would be something if it were the data set of choice to apply the coworker model, that could be something that might be necessary, I think.

MR. FITZGERALD: I mean, Rev 4 of the coworker model that we're coming out with, it only goes through 1989, primarily because of that issue.

We're exploring whether to do just NOCTS beyond that, or whether the Site could provide that other database so we can sort out who was Bechtel and who wasn't?

MR. FITZGERALD: I think we get pretty volatile after '89. That's another reason that I'm not going to guess what death might look like but it would certainly be a consideration.

DR. TAULBEE: I mean, again, we're looking at a large population here for these years, and do we need to go to that step? That's up to the Work Group.

If the Work Group decides we need to, we can do it. It's doable. The data is there. That's not a problem.

It is going to be labor-intensive but I say labor-intensive -- the big thing will be if the Site will release the biggest thing, the security one that we used when we're down there to identify individual claims.

We identified subcontractors here by going to into the claimant file and from there, we could identify who was Bechtel and who wasn't, or MK Ferguson or one of the other subs?

We wouldn't necessarily have to do that on the full data set if the Site provided us a data set that we could marry the two up with.

And you marry them based on the Social Security number.

HPRED has the Social Security number in that data set that we were using down there to identify who it was.

MR. FITZGERALD: For the '90s?

DR. TAULBEE: Yes, for the '90s. It was all by Social Security numbers.

MR. FITZGERALD: You type in the number and you got it?

DR. TAULBEE: Right.

MR. FITZGERALD: That part is manageable.

DR. TAULBEE: Right.

CHAIRMAN CLAWSON: Tim, I'm looking at some of these right here, from the years '91 to '95, they're just looking at plutonium, Pu-237, 238, and 239?

DR. TAULBEE: Yes, sir.

CHAIRMAN CLAWSON: Then, when we get to '95, all the sudden they start bringing in the uranium and the strontium --

DR. TAULBEE: Strontium-90.

CHAIRMAN CLAWSON: Strontium-90.

DR. TAULBEE: Most likely, they went to another area and were doing work.

This is a carpenter, and one of the things that Bob was pointing out was we can't really distinguish between whether this was routine or job-specific.

These can actually be job-specific that he signed in on, and which is why you've got uranium for that particular area.

CHAIRMAN CLAWSON: Well, if you take a look at this, this says '95 and then you go to '96 and it's the same thing.

DR. TAULBEE: They're in the same area.

CHAIRMAN CLAWSON: Well, it looks like the one-year sample, now the samples have increased and, check, now they're back to just plutonium.

DR. TAULBEE: Oh, by the way, on this particular page, this individual just has termination samples. So, he left at that point.

CHAIRMAN CLAWSON: Okay.

(Simultaneous Speaking.)

DR. TAULBEE: And they monitored by area.

MEMBER LOCKEY: When I looked at that, there were what looked like short-term workers included in that group, people that worked there maybe three months, six months, nine months.

So, to address Joe's question about short-term workers came in and went out, if you would look at those people that worked less than a year and compared their data to those who worked longer a year, would that answer your question?

DR. TAULBEE: I think that would help.

I think it's difficult with NOCTS, I think Bob made the point, that you can't easily distinguish; you can only surmise by the time period involved, whether it's less than a year, less than six months.

I mean people that are in and out, that would be probably a better indicator. If somebody's there four years, that's almost like a routine worker.

MEMBER LOCKEY: So, the question is

did they hire short-term workers to come in and take care of dirty jobs? That was the question.

So, if they look at this data by people who have worked there less than a year --

DR. TAULBEE: That would be a better set.

I don't have a real good handle on -- when you say in and out, I don't have a good feel for what that means, whether it's in months or a year or two.

MEMBER LOCKEY: A year's a reasonable -- you have to make a decision.

DR. TAULBEE: Yes, I think a year would be a better measure of that.

MEMBER LOCKEY: And compare that to the people that are greater than a year or greater whatever.

That would at least help address that question, whether the short-term workers were brought in to take care of a dirty job or not.

DR. TAULBEE: Okay, you're probably not going to see that, but we can certainly do it from that standpoint.

Especially if you look at some of these people, if you take them to where they've got monitoring data across the whole time and then they've got some monitoring data, a break, and monitoring data again, we can certainly compare that within the set, within the data set.

Where was I going with this? Sorry. The issue, though, of the dirty job is that when we say they would burn out, they're meaning external burnout.

They're working in a high-level external area and so their dosimeter badge showed high external dose and they were moved out. Very few intakes, even during this time period.

So, the intakes that occur especially in plutonium facilities are typically due to incidents and accidents, and those are very few and far in between.

So, we can certainly look at it, I'm just betting the 95th percentiles are still going to be basically the same.

MR. FITZGERALD: Is that just a different sorting process?

I mean, we're not talking so much labor-intensive, just sorting different -- it sounds like you can get a fairly quick --

(Simultaneous Speaking.)

It would just be interesting to see what it would look like.

DR. TAULBEE: That is something we could do.

What are the Work Group's thoughts on do you want us to try and compare this data set to the full data set in HPRED for subcontractors?

Is that required? Because if so, we need to get working on it.

MR. FITZGERALD: I would just intercede that we haven't even had a chance to look at this. This is the first time we've actually heard of it.

I would like to take a look at it.

MEMBER LOCKEY: I would suggest that we look through the data sets.

MR. FITZGERALD: I'd be interested to see it in a little more detail today.

DR. NETON: I've been skimming this

data and I'm having trouble finding very few positive samples, just like before.

So, I don't know what the distributions look like on this at all, but they're --

DR. TAULBEE: I mean there are several steps, one of which would be to look at this and certainly --

(Simultaneous speaking.)

MEMBER LOCKEY: That would be another look at this -- above or below the level of detection.

MR. FITZGERALD: There's different ways to sort the data.

I would like to think you could look at all that before you would go into a labor-intensive process, which I think is going to be essential if it turns out to be the data set of choice, just because I think that question of validity would be there in any case.

But I certainly wouldn't suggest pushing that trigger until we have a chance to really get familiar with the data and be able to

know what's there and to understand if there's any other issues perhaps that ought to be addressed by the Work Group.

CHAIRMAN CLAWSON: Well, and you haven't even been be able to take a look at this.

MR. FITZGERALD: No, so --

CHAIRMAN CLAWSON: First of all, let's let SC&A take a look at the information we're seeing here today and go from there.

DR. BUCHANAN: You said that it's not in our report yet.

DR. TAULBEE: Not yet. It's up on the SRDB though.

MR. FITZGERALD: Well, the PDF --

DR. TAULBEE: But the data is not. I mean, we did a spreadsheet and we were just tagging did they have monitoring or not.

MR. FITZGERALD: So, it may be a while before we actually see something that's pulled together?

DR. TAULBEE: But that date is in HPRED so it won't take us too much of an effort to extract it all out of HPRED.

CHAIRMAN CLAWSON: What type of time frame are we looking to add that report in?

DR. TAULBEE: I'm hoping to have it before the next Board Meeting but I can't guarantee that because of just our review cycles. And this data, it takes actually reviewing that, so.

So, the same, by the way, with my presentation slides, I don't know if you saw them? There's some overview in there.

And that's from the Site, some of their figures. That has to be reviewed by them and we can't review that.

MR. FITZGERALD: Right, so we need to get these handouts back to you?

DR. TAULBEE: No, you can keep them.

MR. FITZGERALD: We can keep them?

DR. TAULBEE: I mean, you're on the project.

(Simultaneous speaking.)

MR. KATZ: Your records, speaking of which, when you do get these cleared, the presentations and so on, you should get them PA-

cleared and 508.

CHAIRMAN CLAWSON: I'm also wondering about will the court reporter be able to --

MR. KATZ: Well, that's okay, we'll make do with that.

DR. TAULBEE: I've not identified any claimants.

MR. KATZ: And on one of those things you had the case number or claim number or something? In the left column?

DR. TAULBEE: Oh, yes.

MEMBER LOCKEY: Some of the short-termers had positive results.

DR. TAULBEE: Did they?

MEMBER LOCKEY: Yes.

CHAIRMAN CLAWSON: We'll look at it and we'll go from there.

Tim, is that it?

DR. TAULBEE: That is all that I have prepared.

CHAIRMAN CLAWSON: Okay.

DR. TAULBEE: I believe so. Let me make sure on my next slide, make sure we covered

that last slide.

MEMBER LOCKEY: Tim, that's a lot of work.

MR. FITZGERALD: Yes, I will raise my hand and say I put E on.

Again, I think I said it earlier, a lot of good work done in terms of refining what we knew from a year ago.

We didn't know a whole lot but refining it down to the kind of analysis that we talked about today.

But what I'd like to do, sort of as a closing discussion, is to go back to the Imp Guidelines, the Implementation Guidelines, and talk about the issue of representativeness and some of the concerns I articulated earlier in my opening presentation.

Because I think the discussion a few years ago which presaged this guide was, yes, we have a situations where we needed more objective discussion of what the basis of judging completeness might be, what are some considerations and how that might result in some

kind of agreement on the viability of the coworker model.

And I think this is actually a good example of a situation we're in, and what I like about it is there's a lot of other considerations whether it's health physics considerations, intentional intakes, or solid program, whatever that might be.

Other issues such as the available NOCTS information on what might be applied, as we just discussed.

But really, coming down to how one is going to judge comparable activities and relationship to the radiation environment.

Which, for this particular group of workers, where you're dealing with job-specific bioassays and a basis for why those were job-specific bioassays, I think that's fertile ground, just to be clear on where NIOSH might see a question of representativeness or not, and whether one should apply I know you called it the chronic database.

I guess I call it the routine

sampling. But I guess that might be --

MR. FITZGERALD: Well, chronic exposure model.

DR. TAULBEE: Chronic exposure model. And this is not the classic incident-based intermittent exposure.

This is more or less the -- actually, the job-specific bioassays were considered part of the routine program at Savannah River, or one facet of it.

But, yet, the exposures were not only intermittent, but also targeted to specific source terms that, in some cases, were somewhat unique given the particular jobs.

Or in some cases more complex because of the type of activity, whether it's D&D or waste management, whatever.

And what I want to read, just to kick this off, and this comes from, and I'll cite the SRDB numbers.

I think we did that already in some of the discussions, but this comes out of some of Westinghouse's policy statements from the early

'90s on the issue of trying to get it right in terms of source terms that would be reflective on RWPs for job-specific bioassays.

And for the folks on the phone, I'm just going to read it, but this first one, for example -- yes, 167760 is where I'm going to start. It's the second page.

And I'm going to read this for those who don't have access to the SRDB on the phone.

And this is an excerpt from what is -- the subject is understanding urine bioassay sampling, which is sort of a Westinghouse, if not policy statement, it's sort of an expression of practice in this particular area.

It's very important, and this is a quote, it's very important to realize that being on a routine sampling program does not automatically cover the bioassay sampling requirements specified on the RWP.

In fact, section 5.2.4 of 5Q1.1, which is the radiological work permit procedure used, requires that the radiological control supervisor identify the RWP bioassay requirements so that

they were consistent with what is effectively 5Q1.1, which was the routine program, the in vivo and in vitro bioassay scheduling and administration.

And what it goes on to say is this link between the RWP procedure and the routine in vivo, in vitro bioassay scheduling procedure was eliminated -- this is 1999 -- because routine sampling programs may not be appropriate for work involving non-routine mixes or concentrations of radioactive material.

For example, a worker with plutonium or Pu-02 only on his or her RQB, is performing work requiring respiratory protection on a piece of equipment of a questionable history in 773-A.

Due to the history of the facility and the experimental nature of the work performed in SRTC, this is a technical lab, there could be any number of radionuclides present on the equipment.

For the sake of this example, we'll assume americium is present.

Thorough characterization of the work environment will then be needed to make such a

determination.

In this case, the routine program would not be adequate because it does not include americium. This is the RQB.

If there was an undetected break in the integrity of the respiratory protection, and radioactive material gained access to the body, the americium would go undetected by the routine Pu sample program.

A job-specific sample must be requested by radiological control for americium or the individual must be on the americium program.

In this case, the routine program would not be adequate because it does not include americium.

The key word in this type of sampling is routine, and that refers to the typical work environment encountered by a rad worker.

Now I'm going to go to another SRDB, which, same time frame, this was a little earlier, 167753.

And this was the subject of this

particular one, and this was dated August 13, 1998, with the specification of bioassay requirements on radiological work permits.

And the summary is in response to a concern over prescribing the correct urine bioassay sampling program on RWPs.

Radiological control operations, RCO and health physics technology, HPT at Savannah River --

MEMBER LOCKEY: Which page are you on?

DR. TAULBEE: The first page, the very front page.

-- are working in tandem on a pilot program to establish guidelines in determining the radionuclides of concern for urine samples in the burial ground?

For facility, and this is sort of as a observation, for facilities such as 221-F-B-Line where the source term is well defined enough, subject to change, it's not a concern to actually reflect the actual source terms.

Because unless there's a major change in the facility mission, to ensure the proper

radionuclides are identified for the RWP urine sampling program, it may be necessary to perform a thorough characterization of the work environment.

It is important also that this characterization be performed on a routine basis and stay current with the source term present.

DR. TAULBEE: If I could interject there for just a second here, Joe. We did some interviews: Brad, you, me, and Mike back years ago down on site.

And they indicated that whenever there was an upset condition, contamination was found.

But they did the characterization before they issued the request for the bioassay to identify which radionuclides were present.

MR. FITZGERALD: Okay, if I can continue? Yes, the time frame is the key here because, again --

DR. TAULBEE: They said it starts at '86?

MR. FITZGERALD: Well, the did a self-assessment in '98, which identified the fact that

this wasn't being systematically done in terms of the actual source terms, and weren't being reflected in RWPs, as far as job-specific bioassays.

And I could give you the reference to that. And actually, the procedure they put in place is the one dated March 10, 1999.

This is 167754, which is the actual specifications of urine bioassay requirement for radiological work permits.

And if I could read from this, this is routine bioassay compliance issues led WSRC to revise the site-wide in vitro monitoring program, effective March 1, 1999.

The methodology used to determine the facility radiological source terms for bioassay compliance was also identified as needing to be reviewed and updated.

Historically, bioassay requirements were identified by the Radiological Control Operations, RCO organizations through facility process knowledge, i.e. safety analysis documentation, procedural guidance, and

professional judgment.

The methodology discussed in the memorandum, in this memorandum was used by Health Physics Technology, HPT, to update or re-verify facility-specific radionuclides of concern for bioassay program compliance.

The routine urine bioassay program is based on the premise that monitoring must be performed after the fact to verify that radioactive material is not being internally deposited in workers.

Additionally, this verification process confirms that established engineered and administrative controls, its function, and its design.

This concept is fundamental to regular bioassay monitoring programs and establishing guidance by the Department of Energy.

SRS radiological workers performing tasks in radiological control areas, it's HTAs and ARAs and I can't remember the --

MR. KATZ: High contamination areas for radioactive areas.

MR. FITZGERALD: Which usually require respiratory profession have an increased potential of receiving intake of radioactive material.

These workers are placed on a urine bioassay program for the radionuclides present in the workplace, as identified by the RWP.

And going back to the impetus for this, this is on 167676, which is the response to the compilation of the Price-Anderson Act amendment internal dosimetry issues.

And it was an item-by-item -- I think it was 31 items but I'm not positive -- review by Westinghouse in terms of what issues applied to SRS versus other sites.

And number eight on that self-assessment, workers enrolled in incorrect routine bioassay programs is the subject.

And the response by Westinghouse was this was an SRS issue, both the workers who require routine bioassay and the correct radionuclides for analysis are determined by RWPs under which they work.

Earlier this year, it was determined that some area site workers were potentially exposed to americium, but that radionuclide was not recognized as an issue when preparing RWPs for those areas.

And then it goes on to say, as a result, rad hazards are now more formally documented and are both a periodic review and a method for re-evaluation is to find in these other actions to do self-assessments and to issue the policy we're talking about, which is the specification for source terms in RWPs, which was the one on March 10, '99.

So, just as general background, the issue I wanted to talk about represented in this is in terms of job-specific bioassays, one concern I have is that as far as the bioassays that were taken, it's not clear to me they were necessarily representative in any case, and it may not be exclusively job-specific; it may be across the board.

This gets into the enrollment issue that DOE was concerned about from site to site

that, as I said earlier, you're talking about a site that went through a lot of fundamental changes.

And you had a relatively stable site that was producing Pu-238 tritium in the DuPont era.

And in the '90s, it had to do a lot of D&D, a lot of environmental cleanup, a lot of waste management, and bringing a lot of short-term workers into the K reactor restart.

And you're talking about going from a very stable source term environment.

The one that was very unstable, that you in fact have -- it was a very dynamic environment that you had to in fact maintain an equally dynamic characterization of what the heck you were actually handling in order to make sure that your job-specific bioassays are targeting the right radionuclides.

To me, americium is maybe the tip of the iceberg.

It's unclear what wasn't being monitored for, but I think another example that

came out with documentation was somebody was looking at the solid-waste management program, and all of a sudden saw curium figure in some of the documentation.

I said wait a minute, we're not monitoring for curium. And went back, and as it turned out, curium wasn't present without plutonium so they were okay.

But that also was a flag that the characterization program wasn't keeping pace with what was a pretty changing environment on-site with new and different source terms.

And I think the admonition they've had here was be careful, don't continue applying your routine program as a framework for your job-specific bioassays in the RWPs because you're dealing with unique mixtures in some cases, and you can't do that.

And they had a procedural link which I think is -- if you think of it from an administrative standpoint, if you're the RCO or the line manager and the link is that you need to refer back to the routine program to basically

identify your source term, that can certainly continue a process where you're using the same source terms even though the facility itself has changed its mission, or workers are moving from one facility to another and they might have the RQB that has radionuclide X consistently assigned to this facility.

But if it's CTW, they're moving around the site, and the situation there is, is the RQB keeping up necessarily with the source terms they're experiencing at different locations in the site or not.

And if you were referring 835, I can't make a judgment about 835, but this certainly would have been a factor I think if this would have been identified as one of the issues because, again, you have unmonitored workers.

In my view, and maybe I'm wrong about this, but this sort of reminds me of some of the issues that we looked at at other sites where neptunium was there but they were only monitoring for plutonium.

And it was unmonitored exposure for

neptunium, and we looked and looked and looked at but could not find any monitoring data.

There was no way to develop a coworker model for something that wasn't monitored for.

And that ended up being SEC for that particular source term. And the same for other sites, mixed fission products, whatever the case may be.

So, in terms of representativeness and I'll be very frank about it, my concern is whether or not, for this intermittent particular exposure category these workers are involved with, and given the circumstances of the administrative controls on how RWP reflected actual source terms, what's the confidence level that in fact you don't have unmonitored exposures due to these nuclides not being accountable.

And that's the question. I don't have a good answer because there just isn't good data.

You can't know what you don't know, because it was never necessarily collected.

But by this procedural change and these acknowledgments I sort of touched on, I

want to put that out there as one of my concerns in looking at this particular situation.

When I walked through the question of representativeness, I had a hard time getting past that particular issue. So, I'll leave it at that.

DR. TAULBEE: I'd like to remind everyone that the routine monitoring program was part of their surveillance, the workplace indicators and things, the air monitoring they had going on, the contamination surveys, looking for not a particular radionuclide, but gross alpha, gross beta.

The routine bioassay, the bioassay program was part of surveillance, these changes and these updates to make sure these people should be on routine americium as well are all upgrading the surveillance program from that standpoint.

The doses were assigned at Savannah River were based upon the special bioassay, based upon the surveillance when something happened, or they had noticed something in the routine, they

went and did --

MR. FITZGERALD: How would you know anything happened with americium if they weren't monitoring for it?

DR. TAULBEE: You get so many people at each of the facilities being monitored, and you've got airborne radioactive areas.

MR. FITZGERALD: But they weren't monitoring for it. I'm not saying it was something --

DR. TAULBEE: Contamination surveys are monitoring for alpha contamination in the area.

MR. FITZGERALD: So, how do you know no americium would figure in that?

DR. TAULBEE: If you're seeing any alpha contamination, you need to follow up.

MR. FITZGERALD: No but, Tim, the issue is that your designing your bioassay program, for the radionuclides that have potential exposure, you would need to know that they were in fact a factor.

And there's certainly no way to

establish that, unless you are looking for it and actually analyze for it.

And this whole analysis that they came up with, this new approach, was a very analytic approach.

I mean, if you look at the SRDB, I think it's 167754, you have a very analytic facility-by-facility approach that used ten percent I think it's ten percent of the --

But the point is the approach that was put in place as opposed to tribal knowledge that was passed on year to year is a approach that the actual characterization information from the site, looked at isotopic data, looked at waste certification process stream analysis data, and actually came up with a very deliberate and careful analysis of what in fact were the key contributing nuclides for what you would want to have a job-specific bioassay program designed against.

And I would even go so far as to add that any bioassay program should be designed against. And this was lacking, it wasn't done

that way.

It was done pretty much by line managers who had been in the facility for years, deciding that these are the things we're worried about, and that was reflected on the RWP.

And that works fine if you have a very stable, contiguous program from year to year.

It hardly changes, you have the same mission, but you start introducing waste management, cleanup, D&D, you have a much different environment, and that's when you have a problem.

DR. TAULBEE: Well, in each of these documents you pointed out, 167760, 753, 754, the lead author or one of the authors on each of those is the same person.

Can I propose that we interview that individual to find out the context of what a lot of the what-ifs that you're bringing up here, and the reasoning behind it, and find out directly from them?

MR. FITZGERALD: I think I'd like to reserve that. I have the same reservations that

I had in an earlier interview and it's not anything to do with the credentials or anything else. I just want to be sure of that for now.

But I want to have really the discussion that I started out with, which is the Implementation Guide puts a framework on looking at the if you want to call it routine.

But we are going to apply the data set, this so-called representativeness, the relationship to the radiological source term, or however it's phrased, maybe I've got that wrong.

But the whole question of does this fit the nature of the work and the source terms involved or not?

I think a lot of this comes down to, it doesn't, and I have reservations, and I'm just being frank about it, and I have reservations about whether under these circumstances at this site, you necessarily have that fit or not.

And maybe you can help me on that?

DR. NETON: Well, are you talking about -- is this post '91? Is that the time period we're talking about?

MR. FITZGERALD: I don't know how far back. It may very well go further back. The fact is you have a situation that's not too unheard of frankly.

You have very expert health physicists, veteran line managers who know their facilities and have been working the same operations for 30 years.

And all of a sudden, there's some changes.

Now, I would guess that it would be more pronounced after '91 because that's when you really start getting involved with new and different source terms, more so than you would have had in the past.

DR. NETON: But what we're really talking about here is the adequacy of the monitoring program itself. That's one of the criteria.

Could the monitoring program adequately see what source terms were present, and that could have been generated?

When I hear you mention it, it brings

into question some of that, but I don't know if it's a wholesale condemnation of the entire program.

I think it needs to be looked at a little bit closer, but I would say the one instance where an americium source term was identified doesn't mean that the program was deficient.

MR. FITZGERALD: No, but the implication is --

DR. NETON: Yes, I know, but you can't -- to take it to one extreme, I think --

(Simultaneous Speaking.)

MR. FITZGERALD: -- careful to read what Westinghouse was saying, not try to give you my words.

The question, though, is americium certainly was an example and curium as well for waste management.

But the precaution about how one manages the characterization of the nuclides that go on the RWP almost precedes the actual bioassay.

DR. NETON: But you mentioned a little earlier about source term indicators and such too.

I'm kind of wondering how that plays in here, where what's the likelihood that you would have only large amounts of curium without other transuranics like plutonium being present, that sort of thing.

There could have been uncharacterized source terms but it would seem to me that if someone worked in a pure curium environment on something, that probably would be no.

But when you're talking about mixture of isotopes where you may be underreporting or underestimating the dose.

DR. TAULBEE: They're not saying underestimating dose. They're not saying that.

MR. FITZGERALD: I didn't say that.

DR. NETON: Careful here. I think firstly, if you monitor for plutonium and there is a curium source term there and it was unmonitored, and you are seeing no positive bioassays for any plutonium, then you've kind of

got to look at this in terms of the bigger picture. You know, what was there, what was present, and what are these additional source terms? What are their magnitude in relation to what was monitored for?

That would take some work. I don't think that's been looked at, at all.

This is a whole different issue, though, we've been talking about. This is really not just specific to subcontract workers or even construction trade workers. This is a site-wide issue.

MR. FITZGERALD: It is interesting what's raised in the context of these bioassays supporting RWPs but, nonetheless, I don't disagree that it actually has a --

DR. NETON: This is a very different issue we have been talking about heretofore.

DR. TAULBEE: Are we going to be receiving a report basically going through what you just kind of went through, something that we can respond to?

NIOSH evaluation of NOCTS subcontractor monitoring 1991-1997

MR. FITZGERALD: Well, I think today I just basically expounded a little bit more on what was in our presentation. But we certainly can put it in a report and we can certainly have that dialogue.

But what I wanted to do is just get a better feel for, and I think we are just beginning to get there, on the implementation guide.

I think your point is that yes, it is a monitoring issue but it is one that may be writ large from the standpoint that you looked a little more broadly at the implications. But certainly, it gets into whether or not it would be representative to use a chronic sampling or a chronic data set to describe what this would be.

DR. NETON: Well, I think either way we'd use the chronic exposure model and that is something that is built in. I mean TIB-81, which SC&A reviewed and I saw no comments, it said that was an inappropriate exposure approach. We used the chronic exposure model, dpm per day intake,

based on fitting the bioassay over a number of years.

My concern though is, again, inadequate characterization of source term and inadequate monitoring program, which we would have to investigate. I don't think we've looked at that at all.

CHAIR CLAWSON: Because didn't we get into this -- well, we got into this, I believe, at a lot of the other sites. But I was thinking, I think it was Los Alamos and Rocky Flats.

DR. NETON: Right but where we got into those sites were specific operations, where they may have had a neptunium project going on and we didn't have any bioassay for neptunium or something like that.

What I am sensing here, though, is this is more about underlying source terms embedded within the operation. I think if they monitor for plutonium, I would assume, maybe I'm wrong, that there is plutonium present in that operation. But there may have been other source terms or isotopes there that weren't looked for.

But again, if you look at it and say well I monitored plutonium, that was the overwhelming source term there and I see nothing, then, what do you do.

CHAIR CLAWSON: Well we got into this in Mound, too, if I'm not mistaken. We got into it on the hot cell because they would go in and they would survey for the overarching isotope and then they would rip out a piece of equipment and expose 30 to 40 years' worth of different isotopes.

DR. NETON: Yes, I don't remember. Mound, I think, but we came to resolution on all the issues at Mound, I know that.

CHAIR CLAWSON: Well, it was an issue that we got into on that. I remember that.

DR. NETON: We've had issues, like I said, of specific source terms being worked on, you know thorium projects and that type of -- we had an americium operation. But I'm not clear, and this is the first I am hearing of this would be these mixed source terms that may have been not appropriately characterized.

MR. FITZGERALD: But apart from that issue, I mean that is certainly an issue, is it your position that the routine sampling -- the workers that were on routine sampling, their basic dose distribution, whatever, would be comparable in terms of the activity?

I'm just kind of looking here at the guidelines and the relationships for the job-specific bioassays.

DR. NETON: I think they did routine sampling for these construction trades workers that were covered under RWPs. If they had -- you know, a chronic exposure model can be approximated by a series of acute exposures. I mean we've been down that path many times.

And it is my opinion that a chronic exposure model applied to those situations would bound the exposures, in particular if there were job-specific samples taken because they were considered to be more chronic in nature.

MR. FITZGERALD: But would you consider those specific jobs that would fall under these RWPs to be then not so unique that

they wouldn't be enveloped by what routine workers were exposed to?

DR. NETON: Well, I think we've already made that decision. We were stratifying the construction trades from the general operation workers, and that's already been decided, that's in the coworker model. We've already done that.

MR. FITZGERALD: So literally, there just isn't any distinction between what the worker -- whether the subcontractor did not perform under these RWPs in terms of job-specific bioassays.

DR. NETON: You mean the subcontractor versus the --

MR. FITZGERALD: Well no, I don't want to get into that stuff.

DR. NETON: -- the construction trade?

MR. FITZGERALD: I think the workers that were doing what could be relatively, you know, handling relatively unique source terms, whatever that may be, whatever Westinghouse described, for example, and what I read you, that could be enveloped by the experience of the

routine workers, the workers that were on routine sampling.

DR. NETON: The construction trades workers that were on routine sampling, which included subcontract construction trades workers.

MR. FITZGERALD: So you're saying the in-house, whether it was DuPont or Westinghouse CTWs, that that would, in fact, envelope the workers on job-specific bioassays.

DR. NETON: Well, that's a different question and that remains to be seen because we still don't know of those job-specific bioassays that weren't taken what percentage were in-house --

DR. TAULBEE: Operations.

DR. NETON: -- operations and which were subcontractors. We don't know that. That's an unknown at this point.

DR. TAULBEE: But we do know that from the monitoring methodology, they signed in on an RWP and checked to see if they were on a routine for that radionuclide dose or not.

And the fraction that needed a job-specific bioassay is much, much less than those on the routine, which is why I feel it is encompassing that those other workers, construction trades workers that were on a routine for that radionuclide, their bioassay --

MR. FITZGERALD: Your position is the construction trade workers, their dose distribution, whatever, would be in fact comparable and would address subcontractors.

DR. TAULBEE: Yes.

MR. FITZGERALD: Okay.

DR. TAULBEE: Well, the subcontractor one as well.

MR. FITZGERALD: Okay. I just wanted to get that clarified.

DR. TAULBEE: Which is another question I do have for the Work Group.

We currently, in our OTIBs, OTIB-81 combined DuPont construction trades workers and subcontractors. Does the Work Group feel that these need to be separated or not? Maybe that's not an issue for this Work Group. Maybe that is

for the SEC Issues Work Group.

But we can. It's the issue of do we need to do that.

CHAIR CLAWSON: I think right now, I think we've got to come down to clarifying this issue because, I'll be right honest with you, because I never got to see this either and when Joe writes it up, it will be -- I want to see this.

I think we have got to fundamentally figure out if they were monitoring for the right isotopes before we do anything else. And seeing that this is in their own words of where they are lacking, I think that is the biggest thing right now to be able to evaluate and be able to go from there.

DR. TAULBEE: Are you open to interviewing the author of each of those documents?

CHAIR CLAWSON: Let's get the write-ups first.

DR. TAULBEE: Okay.

CHAIR CLAWSON: Let's get a feel for

where we are at and what we do. Then, we can make a decision from that standpoint there.

But right now, we've got a lot of work out there. We've still got to get some papers from you and from also SC&A. But I think that we need to be able to take a look at this and be able to see what we've actually got and then I think we could make the determination if we were to go forward and then what direction to be able to go.

Because I'm going to be honest, I'm sitting here thinking back through the years of these issues and it's when we get to the very end of these sites that we've come to find out because correct me if I'm wrong, at Rocky Flats, we issued an SEC because they didn't monitor for what isotope was it?

DR. TAULBEE: Neptunium.

CHAIR CLAWSON: Neptunium and also for Los Alamos, wasn't it?

(Simultaneous speaking.)

MR. FITZGERALD: Mixed fission.

DR. TAULBEE: Lawrence Livermore was

the neptunium.

(Simultaneous speaking.)

CHAIR CLAWSON: Okay. I'm sorry. A lot of these sites --

DR. TAULBEE: -- there are some specific examples of sites.

(Simultaneous speaking.)

MR. FITZGERALD: U-233 was unmonitored.

DR. TAULBEE: But as Jim was pointing out, those were operational.

DR. NETON: There's specific operations where we couldn't find any monitoring data for it.

MR. FITZGERALD: And as you just pointed out, we're not clear on what operations may or may not have lacked the source term characterization.

CHAIR CLAWSON: Okay, I think we've got to be able to digest everything.

You know I think this has been a very, very good meeting. It's given me a headache. So it will give us a lot, but also a lot has come

out in this and we have got an awful lot to be able to digest and get a good feeling for where we're really at is my opinion.

I think that we've got -- each side has several things that we need to be able to produce to be able to give to us. And I think that's where we need to be able to go to and then evaluate where we're at because I'd like to have a write-up from SC&A on this. And I'd also, Tim, you've got a write-up for the paper that you have there that we still need to be able to get.

And I think that's where we need to get to first and then be able to decide from that point forward where we need to go.

DR. TAULBEE: For the upcoming Board meeting at Savannah River is on the agenda, what do you want from us to present?

Do you want me to condense this down into a shorter presentation?

CHAIR CLAWSON: Yes.

(Laughter.)

CHAIR CLAWSON: No. You know what? You guys -- we don't have four and a half hours

to be able to do this. And you'll be leaving before then.

MEMBER LOCKEY: No, I won't be leaving.

CHAIR CLAWSON: Oh, you won't leave in the middle of it?

MEMBER LOCKEY: I will stay.

CHAIR CLAWSON: Okay. I don't -- everybody got a chuckle out of that. I don't want you to think that I didn't -- it was very good but we've got to be able to condense it down enough because these other people, at any -- we have an awful lot to be able to go through and to be able to understand.

But I think we need to get those condensed down, both sides of it, and review it and make sure that we're bringing out the points that we want to be able to address.

MR. KATZ: So do we have a Joe presentation and a Tim presentation?

MR. FITZGERALD: Well I think we --

MR. KATZ: You just want one presentation and summarize the development?

MR. FITZGERALD: We have a set amount of information which might be about an hour and a half agenda item. And I think we can parse out how much time is necessary.

I would think Tim is going to need at least an hour. I don't think I need more than 20 minutes.

MR. KATZ: Okay. Okay, but I'm just -- but we will have two separate presentations?

MR. FITZGERALD: I think so only because I think there is still some difference in perspectives that ought to be conveyed.

MR. KATZ: Do you want Tim then to kick off and you to follow?

MR. FITZGERALD: That's fine.

MR. KATZ: Whoever wants to set the stage.

DR. TAULBEE: I think maybe for a half hour to a 45-minute presentation to allow some questions.

MR. KATZ: Yes, absolutely.

CHAIR CLAWSON: Well you're going to have some questions, I can guarantee it.

DR. NETON: I'd like to be able to distill this a little bit.

MR. KATZ: Yes, well --

(Simultaneous speaking.)

DR. NETON: No, but I mean not just to distill Tim's presentation but, is there any common points of agreement here?

MEMBER LOCKEY: I'm going to have to go back to your seven points and look at those seven points you gave.

MR. FITZGERALD: How much time do we have? Yes, I agree. How much time do we have to kind of massage this back and forth?

I mean I do think we can identify areas of agreement and maybe highlight where we still have issues.

CHAIR CLAWSON: I think that would be the best thing.

MR. FITZGERALD: That would be more coherent.

CHAIR CLAWSON: I mean just to go over both of these presentations again --

(Simultaneous speaking.)

MR. FITZGERALD: -- with the Work Group involved, meaning you and Brad, and whomever, just so you can see what's going back and forth. And then come up with -- you know, maybe come up with one presentation. That might be a heck of a lot easier for people to digest instead of having two more.

MR. KATZ: Yes, because I think you can agree on what you agree on. I think you can also agree on what you don't. And that can all be distilled in one presentation.

Tim has more material, I think, so he ought to kick it off.

MR. FITZGERALD: I would be fine having Tim articulate where things stand now, as long as we have a chance to go ahead and --

MEMBER LOCKEY: I'm not sure we understand.

CHAIR CLAWSON: What you're saying, Jim, is let's go over the seven points right now.

MEMBER LOCKEY: Yes, I want to see where Joe and Tim, where they agree or don't agree on these seven points.

CHAIR CLAWSON: Let me make sure of -- are you flying? Am I the only one flying out?

MR. KATZ: I'm flying out, too. We're flying out.

CHAIR CLAWSON: What time?

MR. KATZ: So I'm flying out at something like 4:30.

MEMBER LOCKEY: I think it is important to do this.

MEMBER LOCKEY: I think we have a few minutes, right?

CHAIR CLAWSON: Let's go --

MR. KATZ: Yes, it's still not 3:00 yet.

CHAIR CLAWSON: Let's go through this and figure out exactly -- because we have gone through an awful lot here.

MEMBER LOCKEY: We really have.

CHAIR CLAWSON: So let's go back through. As you said Jim, let's go through these --

MEMBER LOCKEY: SC&A concerns, their seven concerns.

DR. TAULBEE: Okay, do you mind if I lead off? Okay.

MR. KATZ: Yes, go ahead.

DR. TAULBEE: Workers who performed work at Savannah River under RWP-required job-specific bioassays have substantially incomplete monitoring data. Intakes may have occurred and been missed for transient workers.

I think we have demonstrated that the job-specific bioassay -- this is the last slide -- the job-specific bioassays were just part of that routine monitoring program.

So I don't think that that is a -- that the data is substantially incomplete.

MR. FITZGERALD: I would take out substantially because I think that is a judgment adjective.

DR. TAULBEE: Okay.

MR. FITZGERALD: But I still would claim that --

DR. TAULBEE: I would agree that there is --

MR. FITZGERALD: -- incomplete

monitoring data, intakes may have occurred, and we still have the issue that for transient subcontractors, given the lack of accountable termination bioassay at the time, that they might have been missed.

So I think as a -- and of course, you wouldn't be working on a coworker model unless you were dealing with missing data. Otherwise, you wouldn't be here, right?

DR. TAULBEE: That's right.

MR. FITZGERALD: So I think the first one is just basically acknowledging that we do have missing data and intakes may have occurred, without getting into the likelihood, but that may have occurred.

So if we can agree on that, taking out substantially, I think, in retrospect that gets into a lot of --

DR. TAULBEE: You know there could be a lot of other issues that would affect our coworker but these job-specific bioassays missing, the only open item that I see is who that population was.

MR. FITZGERALD: Right.

DR. TAULBEE: -- whether it was operations versus the other, this the only follow-up we have with that.

MR. FITZGERALD: I was actually taking Stu's lead and throwing it out there saying that would be a good thing to look at. I guess I --

MR. HINNEFELD: I'm still in kind of the same place I was, is that we kind of think that there may be three cohorts or -- there may be two or maybe three cohorts at work. There is the prime operations people, the prime construction contracts workers, and the subcontract construction workers. Okay? Maybe three, maybe all the construction guys go together. You know that's not necessarily firmed up but maybe there are three.

So, and we've got a lot of bioassay monitoring. A very high percentage of people were monitored, taking an aggregate.

So the question then becomes of those three cohorts, is there a cohort that is particularly affected by the missing job-specific

bioassay data, such that it would call into question whether your entirety of data, the whole big mass of entirety of data is really as good as we think it is for that one cohort.

So that was my question about who was missing. That's the thought process. Still, the question still in my brain is that when we've got missing data, who is that? What cohort is that and does that affect our ability to do that cohort in a coworker model, given all this abundance of data we have in general?

So that was my question. I still have that question.

And then to me the other question that is open is the -- were the sources characterized appropriately, in light of what Westinghouse said in its 1998 kind of get out of jail free enforcement period, apparently that was when they prepared that.

So to me, those issues are the ones that are out there.

DR. TAULBEE: Those are the top two. Those are the number one and two.

MR. HINNEFELD: Okay. So to me, those are things that still need investigation. And I don't know, of the other things that we've talked about, are there more questions than those two?

MEMBER LOCKEY: Well, let's go through this list, then.

MR. HINNEFELD: Okay. All right.

MEMBER LOCKEY: Let's go through the list.

DR. TAULBEE: So number one, the only follow-up here is trying to identify within the job-specific bioassay, which -- was it random across the three distributions or was it primarily one of them?

DR. NETON: And we're waiting to get that, right?

DR. TAULBEE: We are waiting for the field assessments from the site, is the data we are waiting on. They did assessments there on-site.

DR. NETON: But the job-specific distribution -- the distribution --

(Simultaneous speaking.)

MEMBER LOCKEY: So you're going to have that next time. And then you'll look at the transient subcontractors and that's in your gray area. See if there is any difference in those.

MR. KATZ: What's the time frame for those reports coming?

DR. TAULBEE: Well what we've presented here today I hope to get out --

MR. KATZ: No, I mean what you're still waiting on, we just talked about.

DR. TAULBEE: They started working on them the last week of October.

MR. KATZ: But like what's the time frame? Is it months?

DR. TAULBEE: Typically it's less than a month.

MR. KATZ: Okay.

(Simultaneous speaking.)

MR. KATZ: Okay but close to the Board meeting time you'll be getting it.

DR. TAULBEE: Yes, but I won't have it digested by then.

MR. KATZ: Absolutely.

MR. FITZGERALD: But just to clarify again, that includes what Stu was talking about in terms of the identity of --

DR. TAULBEE: Well, I'm hoping to do it. We're hoping to. We don't know. We haven't seen these reports.

MEMBER LOCKEY: That really addresses number two, too, is what you're saying.

(Simultaneous speaking.)

DR. TAULBEE: The other issue that you wanted us to look at was the transient workers are kind of part-time versus what we have --

(Simultaneous speaking.)

MEMBER LOCKEY: -- and the distribution of their bioassay data.

I mean with a short-term transient, the guy works less than a year. And their bioassay data is markedly positive in comparison to everybody else, then that raises a red flag.

MR. FITZGERALD: Yes.

MEMBER LOCKEY: That's the short-term worker effect.

MR. FITZGERALD: Yes, that would be

useful to know.

MEMBER LOCKEY: Yes, that would be useful to know.

DR. TAULBEE: All right. So there's two items really with number one that we need to follow up on.

The second bullet is the RWP jobs often differ by source terms and potential exposures from routine work. Routine monitoring data should not be used as a surrogate for missing RWP monitoring data. And this is different than that RWP issue.

MR. FITZGERALD: No, right. And I think this is one that Jim answered, that basically you've already committed to the coworker model approach and therefore have, in a sense, made that judgment, that in fact you can apply it.

I think we have some reservations about whether or not it meets the criterion, which is that the work is similar and the relationship to the source terms are the same. So that was one where I think we have a

reservation that the data set for routine workers in fact can be used as a surrogate for the job -- workers with job-specific bioassays.

DR. NETON: No, it's not routine workers. It is routinely monitored workers --

MR. FITZGERALD: Routinely monitored workers --

DR. NETON: -- who happen to be subcontract -- who happen to be construction trades workers.

MR. FITZGERALD: Right.

DR. NETON: Because we have a construction trades --

MR. FITZGERALD: Right.

DR. NETON: That was what they chose to monitor the construction trade workers by and large with routine sampling.

MR. FITZGERALD: Right.

DR. NETON: And what you're saying is can a routine sampling program be used to bound exposures for construction trade workers.

MR. FITZGERALD: Yes, construction trade workers that are under job-specific

bioassays.

DR. NETON: Well, not even that

DR. TAULBEE: Again, it's the RWP work and the job-specific is from a work crew, if somebody didn't have that tag on their rad qualification badge. That's what got them into the job-specific.

MR. FITZGERALD: Rather than belabor this today, I would like to maybe continue to dialogue by email or something. I think it would be helpful and this is a pretty important point.

MEMBER LOCKEY: You know I'd like to go through these seven points because we are going to be rehashing this at the next meeting again and we're not going to make any progress.

We have to make some decisions here, I think. Not today but what we are expecting in the next one.

DR. TAULBEE: So is there any follow-up with number two that needs to be done or is it --

MR. FITZGERALD: Well, I think there is a position that NIOSH has taken on this issue

with respect to the job -- I mean coworker model that we have reservations. I'm not sure how else I can say that about you know I think we need to --

DR. NETON: But this is worded differently. This is a potential exposure from routine work. By definition, construction trades workers do not have routine work. They have construction trades jobs, specific jobs.

So it's not like we took the operational people and the annual bioassay and used that. We said look at all people who did construction jobs, pipefitters, plumbers --

MR. FITZGERALD: Source terms and potential exposure from routine work.

DR. BUCHANAN: See that's construction trade work instead of routine work.

MR. FITZGERALD: Yes.

(Simultaneous speaking.)

DR. BUCHANAN: Routine monitoring data from construction trades workers.

DR. NETON: Well routine monitoring data -- it's not routine monitoring data.

DR. TAULBEE: Well it is routine for CTWs. If they had a rad qualification that said twice per --

DR. NETON: The question is, can a routine monitoring program bound exposures to construction trades workers? That's the fundamental question and I say yes. We've already done that.

If we can't use routine monitoring data to bound construction trade workers' exposures, then --

MR. FITZGERALD: And this is sort of a reflection of the admonition that Westinghouse made very clear in '99. I think we actually touched on that a little bit that was a caution that certainly don't apply the routine monitoring data to address these -- this RWP work because, in a sense, it would not necessarily fit, given the unique mixtures that you're dealing with as source terms.

DR. NETON: That's a different issue. That's different than saying they can use routine -- if they adequately had an adequate monitoring

program and it was a routine program, can that be applied to construction trade workers? And I -- we say yes.

Now, is a source term on construction jobs fundamentally different than operations jobs and is that captured in RWPs? That's an open question in my mind.

MR. FITZGERALD: Okay. Well, I think this is a facet of that, less so to the issue.

So this is more source term and potential exposures tied to those source terms.

DR. TAULBEE: That I have kind of down with number six, bullet six.

MR. FITZGERALD: Yes, that might be overlapping bullet six. But I think, again, it is the same issue, maybe restated slightly differently.

MR. KATZ: But we should keep these organized, otherwise it is going to get confusing for people.

DR. TAULBEE: Well, I think I would like to keep that, the source term and the RWP issue down under number six, where it is very

evident.

MR. KATZ: Okay, well, let's --

DR. TAULBEE: We're going to talk about inadequate source term characterization.

MR. FITZGERALD: That's subsumed in number six, then, just to dispatch this.

DR. TAULBEE: So two we can --

MR. FITZGERALD: Make that number six.

DR. TAULBEE: Okay, because it's going to be picked up in six.

MR. FITZGERALD: Right.

CHAIR CLAWSON: Number three. We're down to six items now.

DR. TAULBEE: We're down to three.

Number three, based on NIOSH's comparisons of maximum possible 95th percentile dose distributions of SRS plutonium bioassay for DuPont construction trades and subcontractor construction trades, results indicate a number of years where subcontractor bioassay is two to five times higher than DuPont CTWs.

This corresponds with interviews and subcontractor CTWs who indicate that they were

called in for contaminated work to save the exposure for on-site CTWs.

I believe this is being addressed under number one, where you specifically asked, Dr. Lockey, about the subcontractors, the transients within our Work Group.

DR. NETON: I don't think that's going to address this issue.

MR. HINNEFELD: I think this is the question I was talking about, we either have two or three cohorts, right?

DR. TAULBEE: What did you say?

MR. HINNEFELD: We either have two cohorts or we have three. Either we have operations and construction or we have operations, prime construction, and subcontractors.

DR. NETON: That's exactly right.

MR. HINNEFELD: And so you were talking about the 95th percentile as they had it is not the dose reconstruction. Why do --

DR. NETON: We need to go back and revisit this. I have some ideas about not

presenting but reassessing the data that we have.

Because remember those data were the maximum possible values.

DR. TAULBEE: That's how we calculate time-weighted OPOS. It's a maximum possible time-weighted OPOS.

DR. NETON: But again, there are ways -- like that is not the way we would fit an exposure model. We would fit those data points and we fit the exposure models. Take both models, both sets combined, and then you do a model for each of the ones, it may be possible to show that there is no difference at the end of the day.

MR. HINNEFELD: We actually do the dose reconstruction models.

DR. NETON: Right.

MR. HINNEFELD: But if those two, just looking at the data --

DR. NETON: Looking at the raw data plotted.

MR. HINNEFELD: Okay.

DR. NETON: Because that's not how we would --

MR. HINNEFELD: So that would be the thing to do to see if we think there is two or three cohorts.

DR. NETON: Exactly. Would it benefit -- after we plot the data for an exposure model, is there a net benefit to construction workers to pull them out? And I don't know.

It looks on paper that, yes, it is higher in a couple of years but by the time you fit these intake curves through that, you make it less than a wash because what we don't use that 95th percentile, the data point, we fit the 50th and the 84th percentile of the data and then impute the 95th percentile intakes.

So it is a little different way. We don't use the raw data in our model.

MR. FITZGERALD: And the concern we have here is just what was seemingly a contradiction of sorts in the presentation. And it kind of -- and I don't want to make any more of it. Actually, I used exactly the words that were in the memo.

So really, it is just one of

clarifying what the heck is that.

DR. NETON: I think your finding is well taken. I mean on paper, there are some --

MEMBER LOCKEY: It would depend on the way it's presented.

DR. TAULBEE: Okay, we can certainly do that. Okay, we're going to follow-up on that one.

Question of how complete -- this is item number four. The question of how complete is complete enough. Coworker development can only be answered in the context of coworker guidelines and stratification assumptions that have been validated.

They guide what data sets can be legitimately applied, however, 79 percent incompleteness strains credulity.

(Simultaneous speaking.)

MR. FITZGERALD: I had the same problem.

DR. TAULBEE: I think we have established, though, the 79 incompleteness is of just job-specific bioassays and that is not

falling into one particular --

MR. FITZGERALD: I think it is an admonition that one needs to look at the incompleteness but I don't want to get into the percentages. I think, again as I said earlier, I'm not sure that's the biggest issue we have.

DR. NETON: Well, I think it actually gets subsumed in number one.

DR. TAULBEE: Yes.

MR. HINNEFELD: It does, yes.

MR. FITZGERALD: The issue there, I think ends up, the one that we really hesitated to go any further on, which is just verifying that the stratification can be done from the NOCTS.

DR. NETON: But we've already clarified that we're not.

MR. FITZGERALD: Well, from subcontractor. I think, wasn't there a question of whether anyone had done a subcontractor, or am I wrong?

DR. NETON: No, our coworker model has subcontractor -- I mean not subcontractor --

construction trades and primes, and operations.

MR. FITZGERALD: So going back to what was discussed earlier, you don't see the need to go back and validate the --

DR. NETON: Well, I think what will happen is that will be taken care of in the bullet we just discussed. Like if we go back and do the comparison of the 95th percentiles for the coworker models and say they're in or they are not in, that's the answer.

(Simultaneous speaking.)

DR. TAULBEE: So this is really part -- number four is part of one and three.

MR. FITZGERALD: Well, the solution is.

DR. TAULBEE: The solution.

In terms of -- we're on bullet five. In terms of SRS coworker model development, not just claimant data sets, likely inadequate for dose reconstruction with sufficient accuracy for construction trades workers, OTIB-75 issues identified in 2010. Stratification test yet to be performed.

MR. FITZGERALD: And I think on that one, I think that's actually a source of agreement where it is OTIB-81 --

DR. TAULBEE: Right.

MR. FITZGERALD: -- that ought to be the one that should be looked at. And as I understand, again, we did not express any issue with it.

So I think on that one we would say there is agreement. There is not an issue, although I think I'd want to take that back just to make sure everybody salutes on that particular one.

MR. BARTON: Joe, this is Bob Barton. I just want to point out, I believe it was finding six. You stratify it here in construction and operations personnel but didn't really present a physical basis for that. There have been previous supports but, again, that was before we came up with OPOS.

So, it's not that our review is silent on the issue of stratification --

DR. NETON: Well, but you said we

stratified, not whether we should or not; we already did. And I think, did we not have a meeting on this already? I know it's in the BRS.

DR. TAULBEE: It was in the joint SEC Issues Work Group and this one back in August.

DR. NETON: Yes, we discussed this issue. And I thought there was agreement from SC&A to our response, which is we felt the nature of the two populations were very different.

MR. FITZGERALD: Well, that's what I'm saying, I think we need to go back and just make sure everyone salutes and that is the case. We'll take that action.

DR. TAULBEE: So, number five is SC&A. Okay.

Number six, this is the one where is the source term proper for the RWPs, at least that's what we're combining now.

So we're going to look at the RWP jobs, the proper source term. SC&A, you are going to produce the report.

MR. FITZGERALD: Yes.

DR. TAULBEE: That's what Brad was

wanting on this.

MR. FITZGERALD: But it is probably going to be something relatively brief in a memo report that alludes to this particular item.

DR. TAULBEE: Right and from those reports, we'll meet again and discuss as to whether we want to pursue other interviews or other information in order to look at this review and put the context in the scale that this affects.

MR. FITZGERALD: Yes, I would comment that, certainly, the next step would be maybe official interviews but also, in terms of -- you know these are nice sort of tidbits of policy issues but really the question is sort of the operational one and what are we talking about with respect to Savannah River in terms of the source terms, whether it's waste management, D&D, certain specific operations involving off-site americium, but whatever, that may or may not have been addressed by a routine program.

So that's kind of -- and that's not an incident task so I put that out there and say if

you walk down there, that would be the --

DR. NETON: Well, there may be some operational information that could be used to sort of shortcut that, which is if they took gross alpha air samples and had a pretty good monitoring program, that would flag them to do a source term analysis prior to doing bioassay.

I don't know. I'm just sort of putting that out there.

MR. FITZGERALD: Yes, I think unpacking it and figuring out okay what was the background on that between the experts from the site, as well as documentation of these.

DR. TAULBEE: Number seven, time frame of monitoring gap unclear before 1997 as a worker cohort affected by the lack of job-specific bioassay.

MR. FITZGERALD: Well, I think this is one where you have, as I understand it, some additional sampling that might be presented as far as resurveys.

This is the question of --

MR. HINNEFELD: The what now, self-

assessment?

MR. FITZGERALD: Yes, we don't know, other than '97, what it looked like going back.

DR. TAULBEE: We do know '95.

MR. FITZGERALD: Well, '95, yes.

MR. HINNEFELD: And in fact --

MR. FITZGERALD: We didn't have '95 when we looked at it before.

MR. HINNEFELD: I think it's a fair point to mention if in fact some issue or infeasibility is confirmed in these years that were evaluated.

There is that open question because the data that is available has been evaluated roughly in the '90s. And so then you have a static condition analysis, which is what we used to call the corrective action reporting. You know, when you find an upset condition, the first thing you do is the extent of condition analysis. How far-reaching is this?

And so that is the question then, is how far back. So that would be a remaining question, if in fact it comes to this.

MR. FITZGERALD: And these are two questions. That question, plus the one we already discussed, which is what makes up this job-specific worker cohort. And that's what that second one is.

DR. NETON: And to a large extent, we will address this issue, I think.

DR. TAULBEE: Okay. Well, that gets us through all of them. Just to quickly recap, if I can.

Number one is the job-specific cohort, job-specific monitored cohort. Is there a particular cohort that dominates that particular data set: operations, construction trades, DuPont or Westinghouse construction trade cohort, subcontract construction trades.

Another component to that is for NIOSH to compare the subcontractor NOCTS data, the transient workers versus the full-time workers, the bioassay results from that standpoint.

Number two has been kind of closed but really moved to number six.

Number three is we are to develop an

intake model for DuPont construction trades workers versus subcontractor construction trades workers to better illustrate why we believe that there is no substantial difference between the two. Or if it does show that there is a big difference, then, we'll consider breaking that out. So that is a test that we have to do there.

Number four has been also moved into number one and number three.

Number five, SC&A is to review and uncover.

Number six, this is the SC&A to prepare reports, which is compiling the Westinghouse reports and summarize the issue of the radiation work permits, covering the proper source terms for the areas.

And we don't have any tasks on that now, right?

MR. HINNEFELD: We need to look at that issue.

DR. NETON: I mean we really don't need to wait for SC&A's report. I think we know the gist of the issue.

MEMBER LOCKEY: Are you going to look at the --

DR. TAULBEE: Well, I'm going to read those reports, number one, in great detail.

DR. NETON: Well, I don't know. I mean one aspect is what Joe did. Joe suggested we have got to go back and look at all the possible source terms, which is a huge job.

The other thing is to look at the operations program and say is it somehow covered through some mechanism, such as gross alpha air samples or these other contaminants, how it's a minor constituent of the source term so that monitoring, for example for plutonium, could be used to put upper bounds on.

(Simultaneous speaking.)

MEMBER LOCKEY: And more the case of where there may be more complex is there one bioassay that would cover others.

DR. NETON: Yes, and how big an issue is this?

MEMBER LOCKEY: Yes, and that's the context.

MR. FITZGERALD: Well, I would start with 167754, which is the characterization plan we came up with facility by facility, which is very interesting to me because what they did was take each facility and broke it down to the operations and assigned a source term vis-a-vis operations. And that was based on ten percent dose fractions.

DR. NETON: Okay. So we already kind of did that groundwork.

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DR. TAULBEE: Well, they did it in '97. The question is how far back does it go. I mean what was the magnitude of that problem that prompted them to do that.

MR. FITZGERALD: This is a snapshot for '97. And you took that backwards in terms of waste management, D&D, were there any operations here.

DR. TAULBEE: And number seven is looking for those Westinghouse self-assessments to see if they can shed light on both that one

and number one, by the way.

So, that's where we are at. And I will certainly summarize this, though, in a slide to the Board for December.

MR. FITZGERALD: Well, actually, can you summarize the actions for us this week just to make sure everybody's on the same page?

DR. KATZ: Yes, that's a good idea.

MR. FITZGERALD: You don't want to wait until Albuquerque.

DR. TAULBEE: Right, but I will also, for the report to the rest of the group, Brad, I will have a slide on these.

DR. NETON: Yes, this is much more manageable.

MR. KATZ: Can one of you locals give us a lift to the airport because we're cutting it really close at this point?

(Simultaneous speaking.)

CHAIR CLAWSON: I would want to say one thing, though. I appreciate everybody, again, and I think we really came to ground on one thing, on a lot of things today. But also,

as we are going through this and we are evaluating these source terms, because this is not the only site that, at the very end, we've got to -- that keeps in the background that if we do find that there was as source term that they were not monitoring for and we can't cover it, that's an issue. And we've got into this at numerous sites. And this is kind of why I was taken back on this.

Adjourn

So with that being said, we can adjourn.

MR. KATZ: We're adjourned.

(Whereupon, the above-entitled matter went off the record at 3:06 p.m.)

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